Montana Outdoors

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One Dollar

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THE COVER: The golden trout has been called "the most radiantly beautiful of them all" and a fish ". . . whose golden sides shone as though coated with flakes of the precious metal." In "A Fish-Shaped Sunbeam," Pat Marcuson writes: ". . . even these words inadequately describe its beauty." So to test the adage about one picture being worth a thousand words, turn to Glenn West's cover painting of golden trout. Gold was only one of the lures that brought thousands of people to Montana in the last half of the 1800s. As word of "color in the pan" spread, one camp was deserted and the inhabitants moved on, creating "Montana's Fabulous Ghost Towns" (page 15). An early-day mining camp, Virginia City held and then lost the distinction of being capital of the Montana Territory. But it became—and still is—the seat of Madison County. The government was housed in the Madison County Courthouse, constructed in 1875 and the oldest courthouse still in use in Montana. The back cover photograph and the accompanying article were done by John DeHaas, Jr.

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The Editor's Column

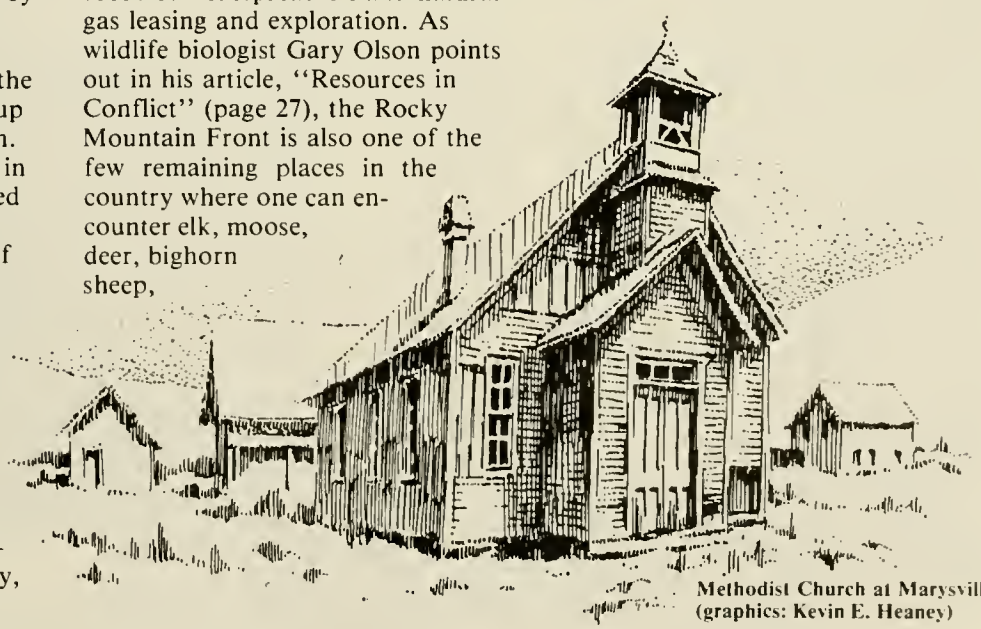
Montana's history is as rich and colorful as the moods and faces of the land itself. The explorers, trappers, prospectors and settlers who moved West in the 1800s came from diverse backgrounds, but they had in common a craving for adventure, unlimited courage and a capacity to endure hardship. Take George Drouillard, who accompanied the Lewis and Clark Expedition up the Missouri in 1805. Meriwether Lewis wrote of him: "A man of much merit, he has been peculiarly useful from his knowledge of the common language of gesticulation, and his uncommon skill as a hunter and woodsman; those several duties he performed in good faith, and with an ardor which deserves the highest commmendation." The place along the Jefferson River where he met his untimely death at the hands of hostile Indians in 1809 is now a department fishing access site (see Dick Ellis' article beginning on page 33 of this issue).

Once explorers and trappers like Drouillard had charted the unknown reaches of the Rocky Mountain West and opened it for settlement, it wasn't long before the lure of instant wealth and the promise of a new life drew prospectors and adventurers by the tens of thousands. Gold was discovered in places like Alder Gulch and Grasshopper Creek in the 1860s, and mining camps sprung up like mushrooms after a spring rain. But as soon as the ore played out in one area, the miners quickly moved on to another, abandoning their mining camps and towns. Many of these ghost towns remain today, haunting reminders of Montana's "boom and bust" history of development (see John DeHaas' article beginning on page 15).

The settlement of Montana, exciting and colorful as it was, took its toll on our wildlife. By the 1880s, the once-vast herds of buffalo had been virtually exterminated. By the turn of the century, when the Montana Fish and Game Department was first established, deer, elk and antelope populations were at critically low levels. An innovative transplanting program was begun in 1910 (see Bob Cooney's article beginning on page 8), helping to restore big game populations to many parts of the state. Since that time, nearly 6,000 elk have been relocated from places like Yellowstone Park to mountainous parts of the state containing suitable elk habitat but few or no elk. Today, due to the transplanting program, acquisition of key winter ranges and careful management, Montana's elk herd sustains an annual harvest of 10,000-15,000 animals. Other species, such as mountain goat, bighorn sheep, antelope and deer, have also benefited greatly from this program.

Despite the remarkable gains achieved through wildlife management, diminishing habitat still poses a serious threat to Montana's wildlife. This is especially true in the part of the state known as the Rocky Mountain Front—the east slope of the Rockies from roughly Rogers Pass to the Canadian border. This region, part of what geologists refer to as the Overthrust Belt, is currently the focus of widespread oil and natural gas leasing and exploration. As wildlife biologist Gary Olson points out in his article, "Resources in Conflict" (page 27), the Rocky Mountain Front is also one of the few remaining places in the country where one can encounter elk, moose, deer, bighorn sheep, mountain goats, grizzly and black bears, cougars, wolves and many other species of birds, fish and mammals, all within a relatively small geographical area. Olson advises a cautious approach to development along the Front until we know more about how mineral exploration will affect the area's unique wildlife resource.

But oil and gas aren't the only treasures being sought in Montana these days. In an article beginning on page 2, Mick Hager, director of the Museum of the Rockies in Bozeman, describes recent fossil discoveries that provide valuable insights into the life on earth some 70 million years ago, when six-ton dinosaurs like *Tyrannosaurus rex* (the "terrible lizard") roamed North America. In a companion article entitled "The Bones of Purgatory" (page 24), David G. Conklin and G. Wesley Burnett explain how a tiny, mouselike primate called *Purgatorius,* which shared the tropical Montana landscape of that time with the dinosaurs, may have played an important role in the evolution of man.—*Dave Books*



Methodist Church at Marysville (graphics: Kevin E. Heaney)

Strange Beasts In Our Backyard

story and photos by Michael W. Hager
graphics by Russ Hoosline

RECENTLY I SPOKE to students at an elementary school in Bozeman about dinosaurs. I asked them: "Have you ever seen real dinosaur fossils? If so, where?" The students began to yell out answers: "Pittsburgh. New York. Washington. Los Angeles. Milwaukee. Minneapolis. Denver. San Francisco. Seattle." "Where were those dinosaurs collected?" I asked. The room was silent and many were puzzled. They, like other Montana residents, were genuinely amazed when told that many of those spectacular dinosaurs were collected in Montana.

One of the first and most perfect skulls of *Tyrannosaurus rex*—in fact, the type specimen (the one from which the original species description was prepared)—was found by Barnum Brown during the American Museum's expeditions to the Hell Creek beds near Jordan from 1901-07. Five skulls and jaws and two nearly complete skeletons collected during these expeditions form the basis of our knowledge about *Tyrannosaurus.*

The original "bonehead," a dinosaur with a skull nearly a foot thick, was found near Ekalaka in 1940. *Pachycephalosaurus* presumably used its thick skull for defense in much the same way a ram today uses its thick skull in butting. This spectacular skull—the type specimen and the only complete one known to science—is displayed at the American Museum in New York City.

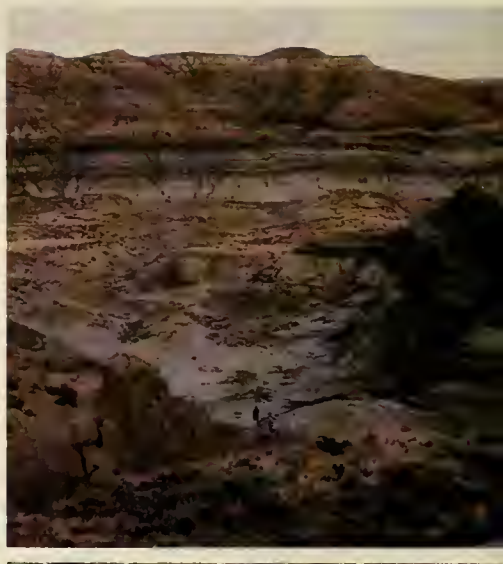
In 1964, Dr. John Ostrom of the Peabody Museum at Yale University discovered a small dinosaur near Bridger that he named *Deinonychus.* This four-foot, 150-pound dinosaur resembled an "oversize road runner." *Deinonychus* means "terrible claw" and it was so named because of a very sharp sicklelike claw more than three inches long on each foot. These claws served as weapons to slash victims. These predators possibly hunted in packs and may have been warm-blooded (see *National Geographic*, August 1978).

Perhaps the most spectacular of all Montana fossil discoveries was made only last summer by John Horner from Princeton University and Robert Makela from Rudyard, Mont. Working in the Two Medicine Formation near Choteau, they discovered 15 baby duckbill dinosaurs and eggshell fragments jumbled together in a nest. Further searching yielded 34 eggs, four of them complete, as well as bones of adult dinosaurs. Dinosaur eggs are extremely rare and only a few have been found in the western United States, France and Mongolia. However, the Two Medicine Formation is the only known site where eggs, babies and adult dinosaurs have ever been found.

With these spectacular finds in mind, I corresponded with collectors from several major museums and universities and visited the Princeton crew in the field near Choteau to enlist aid in preparing a major fossil exhibit at the Museum of the Rockies in Bozeman where I serve as director. They were most cooperative and, in fact, anxious to contribute technical information in support of our efforts. All we needed was financial support for our own field crew.

As I left the Princeton field crew camped on the bank of the Teton River with their treasure of dinosaur eggs, my enthusiasm was tempered by thoughts of field expense. Where would the funds come from? How could we possibly find the kind of support required to collect dinosaurs?

In early September, within two weeks of my return from the field, a Montana citizen concerned about

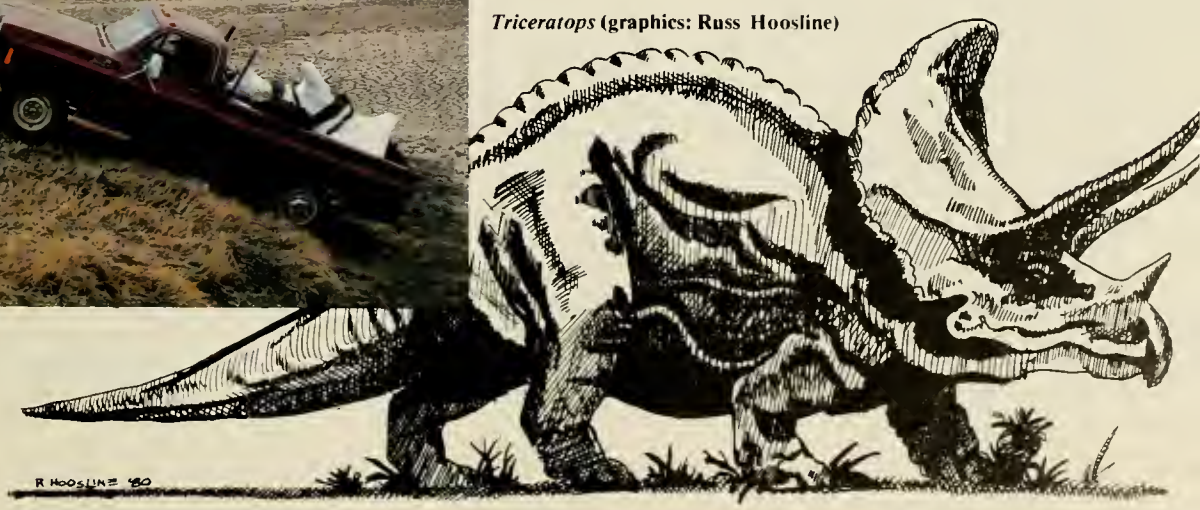


Hell Creek badlands (far left) near the excavation. Black bands in the sediments are coal seams. *Triceratops* skull barely exposed (middle). Note the horns above the eye encased in plaster for protection and the nasal horn slightly protruding from the enclosing rock. Crew members Norm Constenius, Royce Satterlee and Jim Goosey at work (left).

Skull on a pedestal (far left) prior to the application of plaster. Two inches of rock are left on the skull for additional support. Pictured in the background is Ruth Satterlee. Skull is now encased in protective plaster jacket (left).

Skull is winched onto the truck (far left) with the help of Jay Twitchell, Judd Twitchell, Jim Goosey and Al Ridgeway. Jay Twitchell guided his brother Judd up the last steep hill out of the badlands (left). Fort Peck Reservoir was at low water, making this route possible.

Triceratops (graphics: Russ Hoosline)



preserving our paleontological heritage and aware of the lack of adequate support for Montana museums called to offer help. Driving back from his office to the museum, I stopped at a traffic signal and it finally hit me. I had a check for $25,000! I let out a war whoop and then tried to look dignified as people in cars around me strained to see what was happening.

In October, Norm Constenius of Whitefish called to report that he, his family and Royce and Ruth Satterlee, also of Whitefish, had discovered a *Triceratops* skull 60 miles northeast of Jordan on the C. M. Russell National Wildlife Refuge. Anticipating that this might someday happen, I had applied for a Federal Antiquities Permit for the entire Hell Creek region and we were ready, willing and able to leave immediately for the field. Driving to Jordan, several thoughts raced through my mind: Was it complete? Did we have adequate equipment? What problems would we encounter in the excavation? Would we be able to get it out before winter?

As I stood looking at the Hell Creek badlands, I was impressed with the landscape's raw beauty. The variegated brown, red, black and grey sediments looked old and rugged, in sharp contrast to the flat grassland at their base. The short grass was brown and the thin soil cracked from thirst. The cottonwoods along the stream were displaying their fall colors against the brilliant sky. We were all anxious to get started and walked very rapidly toward the site.

Although barely exposed, we knew immediately this was a prize: All three horns were peeking up through the enclosing rock and the broad shield which covers the neck of *Triceratops* was in excellent condition. We went to work immediately; some began digging the hillside back with picks, shovels and jackhammers, while others worked delicately near the skull to expose it. By day's end, we knew we had a giant specimen —7½ feet long.

It gets cold at night camped in that part of the world in October, and we were all tired from hard work. But we were excited and talked and planned until what seemed like the middle of the night. We were in bed by 10 o'clock and back up the next morning by 6. As the weeks wore on and the daylight hours grew shorter, we worked harder and faster, went to bed earlier and slept longer. It was a great contrast to paper work and telephone calls.

In 10 days, we had excavated the rock from around the skull, leaving it standing on a pedestal. We left about two inches of rock covering the specimen for support; we provided additional support by covering it with strips of burlap dipped in freshly mixed plaster. When the plaster dried, the skull was encased in a rigid shell. This was done for the same reason medical doctors place broken bones in casts—to keep each broken piece in the same relative position until it is repaired.

Next, holes were excavated underneath the skull and strips of burlap dipped in plaster were wound completely around it to provide support from below. When finished, it looked as though a giant moth had spun a cocoon around it. In the fading light near day's end, the whiteness of the plaster contrasted with the somber sediments created an eerie scene.

With the skull completely protected, we returned to Bozeman to plan its retrieval from the badlands. We had hoped a helicopter might be able to lift it out, but its great weight—over two tons—made that an impossibility, at least for any helicopter in the region. We were disappointed and worried because the skull was situated more than a mile from the nearest dirt road and 100 feet below the flats in very rugged country. Winter would soon be upon us and we knew the bank would cave in.

We returned to the site, not yet sure how to retrieve our prize. We talked it over with nearby ranchers, Judd and Jay Twitchell and, to use Judd's words, decided, "Oh heck, let's just go down there and wrestle that thing out." We enlisted the aid of Al Ridgeway, U.S. Fish and Wildlife Service officer, and started for the site the next morning. Staring over the first drop into the badlands, I couldn't believe we would get the trucks in, and I was sure we wouldn't get them back out. In addition, the blustery weather worried us all.

Surprisingly, the two-ton skull was simply winched onto the 3/4-ton pickup. It was an interesting sight—like a huge creature being led by a halter. As we looked back at the place the skull had lain for 65 million years, we felt an overwhelming sense of humbleness.

What was this area like during the late Cretaceous Period, 100 to 65 million years ago? The story is there, preserved in fossils and rocks for those interested in interpreting it. Coal is abundant in the northern Rockies and provides a good clue about the climate at the time it formed. Today, coal forms primarily in warm, humid, swampy areas near sea level and, we assume, it has always been so. Marine fossils such as clams, oysters, lobsterlike crustaceans and aquatic reptiles are found over much of the eastern part of the state from the same time period and led to the conclusion that a sea once existed here. Fossil and rock distribution indicates this shallow, narrow seaway extended from the Arctic through Montana to the Gulf of Mexico and that the shoreline fluctuated from east to west in response to the newly forming Rockies. As the Rockies rose, the shoreline was pushed farther east until the seaway was completely eliminated by about 50 million years ago.

Triceratops lived on the coastal plains east of the Rockies and filled a similar role in the late Cretaceous that rhinoceroses fill in Africa at present. There were several different genera of horned dinosaurs (for example, *Styracosaurus* with one nasal horn and six spikes on the frill) and at least six species of *Triceratops*. Our skull is that of *Triceratops prorsus,* a large beast which weighed eight to 10 tons and was 30 feet long.

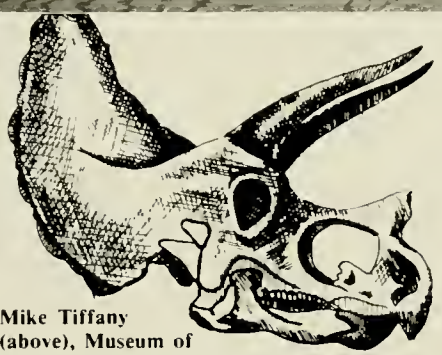
In the swampy lowlands bordering the stream, dinosaurs with ducklike bills were abundant. These hadrosaurs walked on two legs and their bills were adapted for feeding on soft vegetation. Fossilized impressions of skin indicate their feet were webbed and that they were at least partly aquatic.

Tyrannosaurus was the largest carnivore of the day and tooth marks on bone indicate it commonly preyed on *Triceratops*, as well as on the duckbill dinosaurs. However, neither were easy prey because the duckbills could

escape to the safety of the water and *Triceratops* was a formidable opponent with its three long horns, powerful neck muscles and great weight. Also, the large bony frill which covered its neck made it much less vulnerable.

The late Cretaceous landscape was filled with an amazing diversity of reptiles—big, small, swimming, flying, warm-blooded, cold-blooded, herds of *Triceratops*, a variety of duckbill dinosaurs, etc. They were truly rulers of the late Cretaceous Period (about 65 million years ago). And then they vanished, rapidly in geological terms. Why? Nobody knows for certain, but theories abound. Some believe the climate cooled; others say the reptiles were replaced by better adapted mammals; a few believe an exploding supernova may have exposed the larger forms of life to excess radiation; still others believe that sea level changes caused by mountains being built led to destructive climatic effects. Perhaps someday we will have more confidence in one explanation. For now, the theories provide interesting speculation.

The roar of truck engines brought my thoughts back to the present and our problem of bringing the skull out of these rugged badlands. The truck



Mike Tiffany (above), Museum of the Rockies preparator, working on the *Triceratops* skull. Artist Russ Hoosline's rendition of the *Triceratops* skull.

sagged under the weight and we got stuck in a small, steep-sided gully. As Judd stopped at the bottom of the last and steepest hill 100 feet below the edge of the rim, we all gathered to plan the ascent. When all was said and done, it took a heavy foot on the accelerator, and the truck and skull literally flew over the rim to safety!

The skull is displayed at the Museum of the Rockies while it is being prepared for permanent exhibition there. We took off the protective plaster with a cast cutter and removed the surrounding rock with a hammer and chisel. Periodically, the exposed bone was glued to hold it in place and when large sections were exposed, they were thoroughly impregnated with polyester (Fiberglas) resin. At this writing, the plaster has been removed from the top and it is completely prepared and glued. The next step will be to cover it with wet paper to separate the plaster from the bone and then to apply plaster and burlap for support so that it can be turned upside down for preparation. When it is completely prepared and the underside of the frill is supported with metal rods as well as Fiberglas cloth and resin, it will be turned right side up on its final display case. We will remove the plaster and exhibit it along with photographs and interpretive labels.

As you are reading this, we will probably be in the field again. Part of our time will be spent in the same area, excavating bones of a large meat-eating dinosaur (perhaps *Tyrannosaursus*) discovered while working on the *Triceratops*. We will also excavate at the site of a large swimming reptile exposed in marine sediments about 20 miles away as the crow flies (or 200 miles by roads). In addition, we will prospect for dinosaur eggs in the Choteau area with the Princeton crew.

Our goal is to assemble a truly impressive collection of fossils from our region and to exhibit them in a fashion worthy of a state so rich in geological heritage. ■

"A Fish-Shaped Sunbeam"

by Pat Marcuson

"IN THE CLEAR rapid current of the mountain stream, a flash of sunlight is scarcely quicker than the gleam of gold and silver seen for a single instant as the whirling waters are cut by one of these trout. . . ." H. W. Henshaw wrote it in 1878, and it would be difficult to say it better.

But others tried. In 1905, Barton W. Evermann wrote: "This is the most beautiful of all the trouts; the brilliancy and richness of its coloration is not equaled in any other known species; the delicate golden olive of the head, back and upper part of the side, the clear golden yellow along and below the lateral line and the marvelously rich cadmium of the under parts fully entitle this species to be known above all others as the golden trout."

In 1920, Sam Ellis and Dr. H. C. Bryant called it "the most radiantly beautiful of them all," and in 1928, Frank Vore called it "a fighting fish, whose golden sides shone as though coated with flakes of the precious metal." It has also been called "a fish-shaped sunbeam" (E. P. Pister, 1959), "king of the timberline lakes" (John Willard, 1960) and "a legendary fish whose unique and brilliant coloration has brought much notoriety" (Glen Dunning and Jack Conley, 1971).

Fishing for golden trout in the Madison Range (photos: Mike Trevor).

Catchy wordage to describe a fish. But for those fortunate enough to have seen a golden trout, even these words inadequately describe its beauty. It's no wonder this native of the Kern River drainage in the southern part of the Sierra Nevada Mountains was designated California's state fish in 1947.

Golden trout, now classified as *Salmo aguabonita*, is thought to comprise two subspecies, *Salmo aguabonita aguabonita* and *S. a. gilberti*. The species' classification has been disputed since the beginning when Henshaw labeled the golden *S. iridius*. In 1892, David Starr Jordan catalogued the golden in "Proceedings of the National Museum" as a new subspecies of "Cut-Throat trout," *S. mykiss agua-bonita* after Agua Bonita Falls. Taxonomists—scientists responsible for scientific naming—called it *S. roosevelti* after the chief executive; *S. whitei* after Stewart White, novelist and friend of President Roosevelt's, and *S. gilberti* after a zoology professor at Stanford University.

No matter what they were called, one transplant of 13 small golden trout in 1876 was important to other western states. Col. Sherman Stevens and his brother transplanted 13 goldens from Mulkey Creek, a tributary of the South Fork of the Kern River, to Cottonwood Creek, California, where Col. Stevens' sawmill was situated. The fish were carried in a coffeepot across the divide—a distance of four miles—because the Stevens brothers were anxious that Cottonwood Creek be well stocked with fish for their use. In 1891, E. H. Edwards, a storekeeper at Lone Pine, Calif., and two friends planted goldens in Cottonwood Lakes and by 1906, the lakes were described as being unusually well stocked with goldens. In 1917, a spawning station was set up there. This site became the source of golden trout eggs for California and other states. Records show a shipment of 15,000 eggs to England in 1933. From 1928-38, eggs were sent to the National Fish Hatchery in Bozeman (now the Fish Cultural Development Center).

Once, Montana had 40 waters stocked with goldens. Nineteen were stocked directly from the Bozeman hatchery with fish from California's Cottonwood Lakes, 10 were subsequent transplants from Sylvan and Blue Danube lakes (two of the original 19 lakes stocked) and 11 were planted with eggs from spawning facilities at Surprise Lake, Wyo. Now only 10 lake systems in the state have pure strain golden populations. Numerous lakes have hybridized fish, occurring when goldens mix with either cutthroat or rainbow trout.

Artifical propagation of golden trout was attempted in Montana, but it was never successful. Several hatcheries—Big Timber, Anaconda, Creston, Somers and Hamilton—either hatched eggs or temporarily housed golden trout for later distribution to other waters. The Hamilton hatchery had brood stock, but because the facility produced primarily cutthroat trout, eventual mixing could have occurred and clouded the genetic integrity. Most needs were satisfied by eggs taken from goldens at Sylvan Lake.

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Seventy Years of Relocating Wildlife

by Bob Cooney

THEY HAVE BEEN moved by railroad car, truck, packhorse, rubber raft, airplane and helicopter. Since 1910, trapping and transplanting has been part of the state's wildlife management program and made an important early contribution to today's wildlife populations and hunting opportunities.

The Montana Department of Fish, Wildlife and Parks has transplanted elk, mountain goats, bighorn sheep, mule and white-tailed deer and antelope. They have been placed in areas where populations had been eliminated or seriously reduced and have often resulted in re-establishment of herds or recovery of remnant groups. Mountain goats were placed in areas where the species had never been observed.

In the early 1800s, Meriwether Lewis and William Clark noted almost unbelievable numbers of wildlife, mostly along the river valleys and prairie lands of eastern and central Montana. They saw little wildlife in the mountains.

A rush of prospectors accompanied the gold discoveries of the 1860s. Market hunters soon fanned out from the mining camps. This commercial taking of game for meat resulted in serious depletion, particularly of deer, elk, antelope and mountain sheep populations. The heaviest impact came with the virtual elimination of the northern buffalo herd in the 1870s and early '80s. This overharvesting, combined with decreasing wildlife habitat caused by rapid agricultural development, created a serious low in game populations by the turn of the century.

Remnant elk herds remained in the mountains and deer and antelope were scarce. The Audubon bighorn sheep of the breaks and badlands was heading for extinction. The natural reaction was an increased emphasis and interest in conservation. One of the results was a plan to aid in restoring big game populations by transplanting. With a ready supply of planting stock available from Yellowstone National Park, it is easy to see why the program started with elk.

ELK

In 1910, 25 elk were captured on the edge of the park near Gardiner. They were loaded into a stock car, moved by rail to Divide, south of Butte, and released into the Fleecer Mountain area. This was Montana's first elk plant and the beginning of a program that lasted into the early 1970s. During this time 5,856 elk were moved, mostly taken from surplus animals in Yellowstone. They were released in selected areas in mountainous and wooded portions of the state.

During the early years, elk continued to be shipped by rail so plants had to be made close to railroads. Releases in more remote areas were possible as trucking the animals became feasible in the 1920s.

Bulls were dehorned to prevent injury to those who were handling them and to other animals being moved. The elk were eartagged for later identification and many were blood tested.

It is impossible to list all planting sites; a few were the Highwood Mountains (1917), Little Belt Mountains (1928) and the north side of the Charles M. Russell National Wildlife Refuge (1951).

This program has been mostly successful. However, at times elk drifted a considerable distance from release sites and competed with other land uses—which meant a special hunting season had to be set.

Most of the suitable spots for elk were filled by the late 1950s. The transplanting that continued for the next several years was aimed at relieving overpopulation in some areas, rather than bolstering existing populations.

Herds have become established over the years by careful management. The program filled a need during a period of time in the evolution of the department's elk management program.

MOUNTAIN GOATS

The possibility of trapping and transplanting mountain goats in Montana became evident by observing their somewhat limited historic range. When the work began in the early 1940s, there was no proof they had ever inhabited a number of high mountain areas east of the Continental Divide.

The first successful live trapping site was on a high bench along the face of the Rockies west of Choteau. During the first years, goats were brought down from this area on packhorses. Mountain goats were also captured at a natural salt lick on the upper South Fork of the Flathead River. Here, they were loaded onto rubber rafts and floated down the river to a point where they could be picked up by airplane and flown out. Another trap built on the divide near the head of Canyon Creek in the Pioneer Range also furnished stock for transplanting.

Nearly 400 mountain goats have been captured and transplanted in Montana. Introductions were made into the Crazy Mountains, Beartooth Mountains, Absaroka Range, the Gallatin-Madison Divide, the Gates of the Mountains, the Tobacco Root Mountains, Mount Edith in the Big Belts, the Elkhorns, the Big Snowy Mountains and others.

In addition to the pleasure of seeing these spectacular animals in high, remote places, several of the new groups are providing challenging hunting. The Gates of the Mountains introduction has been sufficiently productive to supply planting stock to supplement other herds.

BIGHORN SHEEP

The bighorn or mountain sheep was found to be the most difficult of the state's big game to restock. Today, it inhabits only remnants of its original range. For reasons not yet clear, this fine game animal has had problems adjusting to a new environment.

Trapping and transplanting of bighorns has taken place since the early 1940s. Early traps were similar to those used for capturing mountain goats—made of posts and woven

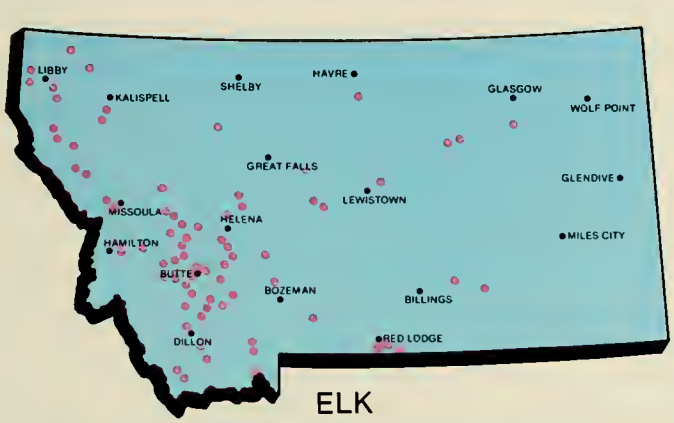
wire. Several changes have occurred. Portable panel traps, made from boards and woven wire, have been effective for sheep.

Since the beginning, much of the live trapping has been carried out in the Sun River Canyon Area. Another important site is on Wild Horse Island in Flathead Lake. Wings were built to guide the animals toward the trap and mountain sheep were successfully driven in by helicopter. Helicopters were also used to transport sheep, both from the island and from the Sun River Canyon area. Additional bighorns have been obtained for transplanting from the National Bison Range near Moiese.

Throughout the program, 953 mountain sheep have been captured and transplanted into suitable areas in Montana. Examples of planting sites include: the breaks on the south side of the Charles M. Russell National Wildlife Refuge, the Blue Hills on the Powder River east of Miles City, the Beartooth Wildlife Management Area downriver from the Gates of the Mountains, the Thompson Falls area, the Olson-Foster creeks drainages west of Anaconda, the East Fork of the Bitterroot and others.

Several of these introduced groups are now providing

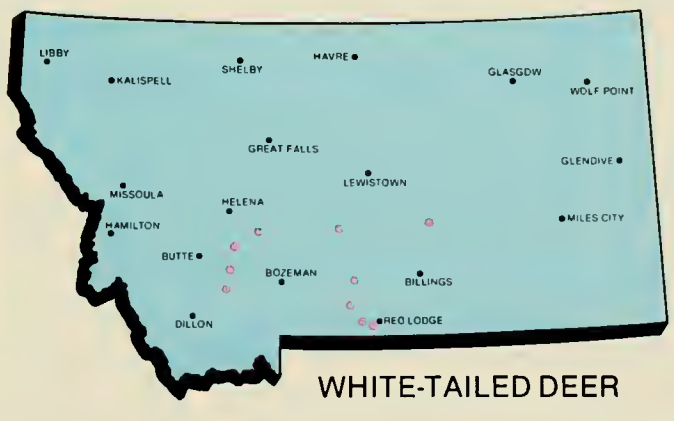
Release Sites



ELK

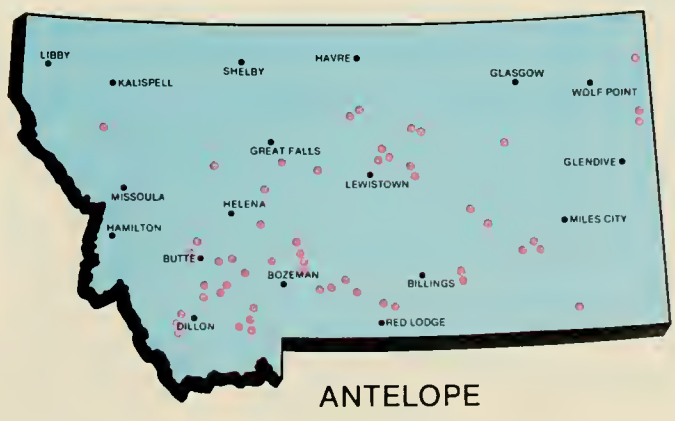
MULE DEER

BIGHORN SHEEP



WHITE-TAILED DEER

MOUNTAIN GOAT



ANTELOPE

sport hunting; others have been less successful.

MULE DEER

With present numbers and distribution of mule deer in Montana, it is difficult to imagine the need for transplanting. But this was not the situation up through the 1930s and most of the '40s, when mule deer were quite scarce in the eastern part of the state. Deer were taken for transplanting from a few areas in western Montana in which they concentrated and from the National Bison Range. During the mid-1940s, 1,327 mule deer were trapped and released into new areas. They were trucked to suitable sites, mostly in the central and eastern part of the state: the Bull Mountains south of Roundup, Wolf Mountains in the Sarpy Creek region southwest of Forsyth, Glendive badlands, near Sidney and in the Lewis and Clark Caverns area.

WHITE-TAILED DEER

White-tailed deer were not evident in the 1940s throughout a number of wooded river bottoms east of the Continental Divide, extending toward central Montana. Such places appeared ideal for the reintroduction of whitetails.

Live trapping in the last half of the 1940s was carried out along the Blackfoot River drainage, the upper Flathead Valley, Lincoln County and the Thompson River area; 339 white-tailed deer were trapped and transplanted. Release sites included: the Jefferson Valley near Whitehall, Boulder Valley near Boulder, the Missouri River Valley near Townsend, the Beartooth foothills west of Red Lodge, East and West Rosebud canyons, Stillwater Canyon upriver from Absarokee and the Musselshell River bottom above Harlowton.

PRONGHORN ANTELOPE

In the mid-1940s, the antelope population was quite low in Montana—only about 8,000 statewide. They were generally found in three areas: the Hi-Line, central Montana and the southeastern corner. This left a number of locations that appeared ideal for introductions and, in some cases, reintroductions.

Many problems had to be worked out in order to capture these fleet-footed dwellers of the open prairie. The first attempt to drive them into a pen by using saddle horses and pickups was a disaster. At a critical point, they turned and went under, through and around the frustrated crew. There had to be a better way.

It was not difficult to talk Cliff McBratney, a World War I pilot from Augusta, into trying his hand at airplane herding. He, and later Jim Stradley of Bozeman, used an effective system. It consisted of flying a series of "lazy eights" behind the running animals. This moved them into the wings of the trap and then a series of power dives urged them safely inside.

An improved trap, devised and constructed by Rex Smart in the DFWP shop, greatly helped operations on the ground. Netting was supported by iron posts and driven stakes and the entire trap was held in place by an encircling cable. It could be put up in a fraction of the time required for the original trap. Several neighboring states and Canadian provinces have since used it.

Nearly 4,000 antelope have been live trapped and transplanted in Montana since the mid-'40s, and 33 areas with no antelope have been successfully stocked. Plantings were made into nine additional areas to supplement small remnant groups.

Most of the planting stock was captured in central Montana and the National Park Service made available surplus antelope from Yellowstone.

Typical planting sites included: the Madison Valley, Shields Valley, Big Timber area, Frying Pan Basin near Bannack, Rochester Basin south of Butte, the Whitetail area north of Whitehall, Hound Creek south of Great Falls, the Silver Star area in the Jefferson Valley, the Geyser area and the Hardin region. For the most part, the transplants have worked out well.

Sportsmen have played a very important role since the first elk plant in 1910. They have pitched in with funding when needed and many times have helped with the actual trapping, hauling and release of the animals.

Ranchers and farmers have been cooperative in many ways. In fact, before animals can be transplanted onto public land, the bordering landowners must approve the action.

Dr. J. C. Burnett and the Bourke MacDonald family were generous in allowing the trapping of mountain sheep on Wild Horse Island for a number of years.

U. S. Forest Service personnel have put in a great deal of time and effort in helping to locate desirable release sites. Through the years, officials at Yellowstone National Park have made surplus elk and antelope available for transplanting. Most of the elk released in Montana have come from this source. Personnel at the National Bison Range have made available mountain sheep, elk and mule deer. Bureau of Land Management officials have helped trap and transplant antelope onto public land and have also assisted with elk releases. State veterinarians have cooperated in assuring the health of animals used for transplanting.

Finally, it seems most appropriate to mention Jim McLucas. He has spent more than 30 years trapping and transplanting wildlife for the DFWP. Jim started in 1946 as the department's live trapping foreman when the program was very new. He developed many of the techniques that have proved highly successful through the years.

In addition to his work in Montana, Jim has helped a number of neighboring states and Canadian provinces with their trapping and transplanting programs. Jim would be the first to mention the help and cooperation he has always had from fellow workers, sportsmen, other state and federal agencies and landowners.

I asked Jim if any one event during his long and interesting career stood out. "Yes," he said, "I think the time I took a group of antelope to Hawaii." During winter 1959, Jim and his crew captured 85 antelope north of Malta. They were trucked to Seattle and loaded on a ship; they spent a little over six days at sea. When they arrived, Jim took the animals through quarantine. They were then picked up by Marine Corps planes and flown to the island of Lanai.

This has been a glimpse of a program that has extended over the past 70 years. Coordinated with other management practices and aided by the efforts of many people, it has restored and supplemented big game populations in many areas of the state. ■

Increased Federal Funds for Fisheries?

Bills designed to increase federal funds available to state fishery programs have been introduced into the U.S. Senate and House of Representatives.

The bills propose expansion of the Dingell-Johnson Act of 1950 and would generate funds by levying a 10% excise tax on fishing line, tackle boxes and other fishing accessories, and a 3% excise tax on small boats, boat motors and boat trailers.

The current Dingell-Johnson Act places a 10% excise tax on fishing rods, reels, creels, artificial lures and flies. D-J funds are distributed to states based on the state's total area and fishing license sales; the state must provide $1 for every $3 of D-J funds. In addition, no state can receive more than 5% or less than 1% of the total D-J funds.

D-J has provided a total of $268 million to state fishery programs since 1950. Yet, state directors of fishery programs claim that inflation and increasing recreational use have made available funds inadequate. "We don't have new programs lined up to utilize additional D-J funds. We need additional funding or we'll have to retrench on existing programs," said Art Whitney, administrator of the Fisheries Division for the Department of Fish, Wildlife and Parks.

Whitney said Montana currently receives about $500,000 per year in D-J funds and that passage of the proposed expansion of the act "would mean a three-fold increase" in federal funds available to the state.

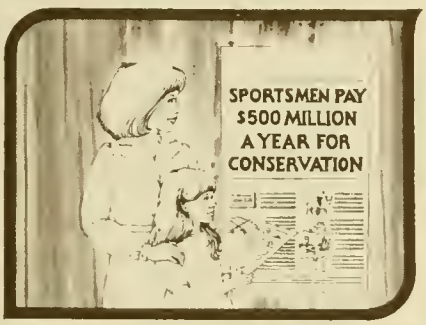
Whitney said additional funds would be used to maintain programs such as fish hatcheries, lake and stream surveys and fish "population manipulation"—reducing or eliminating "rough" fish species and restocking with more desirable species. He said the department's efforts to maintain fish habitat would also be supported by the additional funding. "Our most important program is saving fish habitat from bulldozers, subdividers and pollution, and additional funding would benefit this program," he said.

The excise tax is paid by the manufacturer and is generally passed on to the consumer through higher retail prices. This results in a relatively low cost of administering the program, according to Carl Sullivan, executive director of the American Fisheries Society. He estimated that less than 7% of the funds generated have been consumed for administrative purposes. Sullivan noted the proposed expansion enjoys support from many conservation and recreational fishing groups.

Proponents of the bills claim that boaters should share responsibility for funding fishery programs. They say studies show that 70%-80% of recreational boating is for fishing. D-J funds collected from the tax on boats and accessories would be used to construct boating access areas and new fishing lakes open to boating, as well as improving fishing through construction of artificial reefs, stocking programs, stream improvements and fisheries research.

Opposition to the bills has also surfaced, primarily from the boat, motor and trailer industry, which claims that a 3% excise tax would result in higher prices for their products and would put them at a competitive disadvantage with the rest of the sports equipment manufacturing industry.

But as Whitney explained, "We have considered alternatives to D-J expansion. But after considering all of them, fishery managers nationwide believe that D-J expansion is the most acceptable, fair method of maintaining and improving fishing in this country."—*adapted from an article by Greg Lakes in* Montana Wildlife



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Department Produces New Documentary

The department's motion picture pro-

RECYCLED PAPER

duction unit has released a new documentary, "Who Will Answer?" which examines the relationship between man and wildlife and the future of that relationship.

The 28-minute film traces today's conservation ethic back to the early days of hunting and portrays the modern hunter as a powerful influence on both conservation and wildlife management. Narrated by Montana author and historian, K. Ross Toole, the film asks a provocative question: "If the hunter and fisherman were gone, who would be left to perceive the cries of threatened wildlife? Who will answer?"

The film shows it is the sportsman who has always responded to the plight of wildlife and that the threats to it do not come from the person carrying a rifle or fishing rod.

The movie was filmed by the department's award-winning motion picture production crew, Craig Sharpe and Michael Gurnett. It is available free as a public service for scheduled showings or it may be purchased for $380 per copy from the Montana Department of Fish, Wildlife and Parks, Conservation Education Division; Helena, MT 59601 (406/449-3913).

Wilderness Group Sponsors Walks

The Montana Wilderness Association is again sponsoring a Wilderness Study Walks Program. This year's program will focus on specific threatened roadless areas in Montana and the association will attempt to enlist public support for those areas through the study walks program.

Leaders are experienced outdoor recreationists and members of the association. They donate their time to help acquaint others with Montana's wild lands. Since there is no charge for services included in the walks, participants are asked to provide their own transportation, food and equipment.

Although several of the walks have already taken place, many are scheduled for July, August and early September—for example, Trail Creek near Libby, Pioneer Creek near Jackson and Renshaw Mountain near Augusta.

Many of the trips require reservations. For additional information, contact the Montana Wilderness Association, P.O. Box 635; Helena, MT 59601 (406/442-0597).

Memorial Scholarship Honors Dr. Brown

A scholarship fund has been established at Montana State University in Bozeman in memory of Dr. C. J. D. Brown, an internationally recognized fisheries biologist. He died Dec. 18, 1979, in Prescott, Ariz.

Dr. Brown was a professor of zoology, in charge of fish and wildlife programs at MSU; while there, he directed research for 56 master's and 14 doctoral students. His broad experience in research, in the academic field and with state and federal fisheries agencies made him especially effective in training fisheries biologists. He was a charter member of The Wildlife Society and served as president of the American Fisheries Society during its centennial year (1969-70). His list of publications is extensive, including "Fishes of Montana."

Contributions to the scholarship may be sent to: The C. J. D. Brown Scholarship Fund, Montana State University; Bozeman, MT 59717.

Freeman Monument, Scholarship Established

A monument has been established at Freezout Lake Wildlife Management Area and a scholarship begun to honor Wynn Freeman, long-time administrator of the department's Wildlife Division. Mr. Freeman died in Helena Sept. 2, 1978.

The monument at Freezout was dedicated April 18, 1980 (see photo). Freezout Lake, near Fairfield, is one of the most notable small game and waterfowl areas in Montana developed under Mr. Freeman's supervision. Under his leadership, the department also developed an impressive waterfowl management program which included splitting the state into the Pacific and Central flyways in 1961, and revising the boundaries in 1965 to their present status.

The scholarship has been established by the Montana Chapter of The Wildlife Society as an honorary award to an outstanding junior or senior wildlife student in the Montana University system and it will enable a worthy wildlife undergraduate to continue with graduate work. It will be awarded for the first time at the chapter's 1981 meeting.

Mr. Freeman's contributions to Montana's wildlife resources were recognized by the society's Montana Chapter when he was presented with its first Distinguished Service Award in 1976.

Contributions to the tax-deductible scholarship fund may be made to John Mundinger, secretary, Montana Chapter, The Wildlife Society, 490 N. Meridian Rd.; Kalispell, MT 59901.

NATIONAL HUNTING & FISHING DAY®
Sept. 27, 1980
Helping Insure the Future

Contributors

The logistics of extricating a 4,000-pound, 7½-foot skull of a three-horned dinosaur from a spot it had lain for 65 million years makes for some exciting reading. And the three-horned dinosaur (*Triceratops)* is only one of the paleontological treasures hidden in eastern Montana's badlands. One of the first —and the most perfect—skull of *Tyrannosaurus rex*, the "terrible lizard," was found near Jordan in the early 1900s. A dinosaur with a skull nearly a foot thick was found near Ekalaka in the 1940s; it is the only complete skull of this species known to science. Indeed, there are "Strange Beasts In Our Backyard." Author **Mick Hager** is the director of the Museum of the Rockies in Bozeman where the *Triceratops* skull is displayed. At this moment, he is probably searching for dinosaur eggs near Choteau, or excavating bones of a large, meat-eating dinosaur discovered while working on *Triceratops*, or examining the fossilized remains of a large swimming reptile. His goal: "to assemble a truly impressive collection of fossils from our region and to exhibit them in a fashion worthy of a state so rich in geological heritage." Turn to his article on page 2.

Montana Outdoors readers will undoubtedly enjoy the graphics of the *Triceratops* skull done by **Russ Hoosline**, who works in advertising sales for the Helena Independent Record. He previously was employed by the Billings Gazette in its graphics department. His interests include commercial art, painting, drawing and graphics of all sorts.

The golden trout's color is certainly its most outstanding characteristic, and writers have tried to say so since the 1870s. "A Fish-Shaped Sunbeam" (page 6) is one such description. In an effort to learn more about golden trout in Montana waters, fisheries biologist **Pat Marcuson** has studied their feeding habits in six mountain lakes. He learned that goldens fed freely on available foods from the time ice left the lakes until spawning was completed. Then, they turned to lake bottoms and the larger insects found at lower depths. But most amazing was their lack of interest in zooplankton—the small aquatic organisms which live in open lake water—typically the bread and butter of fish living most of their lives under ice and snow. Marcuson, currently working out of Red Lodge, has spent 12 years on studies of fish in alpine lakes. He is vice president of the Montana Chapter of the American Fisheries Society.

Glenn West's cover painting of golden trout clearly illustrates Barton W. Evermann's words (1905): ". . . the richness of its coloration is not equaled in any other known species." West has a chance to view his subjects first-hand since he spends summers as an outfitter/guide on Montana's blue ribbon trout streams. He has owned a fly-tying shop in Missoula and is an avid fly-fisherman and fly-tier. He is presently back at school, majoring in art education at Montana State University.

"Seventy Years of Relocating Wildlife" is the history of the department's trapping and transplanting program. As **Bob Cooney** writes, the program has made an important contribution to today's wildlife populations and hunting opportunities. In many instances, transplanted animals have been moved to areas where populations had been eliminated or seriously reduced and have often resulted in re-establishment of herds or recovery of remnant groups. Now retired, Cooney joined the department's Game Management (now Wildlife) Division in 1940. Turn to page 8 for his 25 years of perspective on the program's successes, and a few of its failures, too.

Bannack. Virginia City. Granite. Elkhorn. Marysville. The very mention of their names makes one think of man's struggle for riches, the trials of life in a harsh, untamed land, claim jumpers, road agents. And failure—not finding the dreamed-of fortune. But as **John DeHaas, Jr.** poignantly writes, these were the factors that shaped life in the northern Rockies. Something is left for us; "Montana's Fabulous Ghost Towns" are colorful reminders of a chapter in Montana's history. A well-known authority on Montana's ghost towns, DeHaas has written several magazine articles and a book, "Historic Uptown Butte"; with his wife, Bernice, he co-authored "Dillon and Bannack." He also served as associate editor of "If These Walls Could Talk." He has been professor of architecture at MSU for 30 years and is a licensed practicing architect and restoration consultant. His article begins on page 15.

DeHaas' knowledge and sense of history are enhanced by **Kevin E. Heaney**'s ability to capture the mystery of ghost towns and the beauty of the old architecture. The drawings which appear in this issue of *MO* were part of his recent one-man show at the Poindexter Gallery of the Montana Historical Society. He is probably best known for his watercolors and pen and ink drawings, another of which appears in "The Editor's Column." He is an art teacher at Libby Senior High School.

Eastern Montana's badlands are renowned by paleontologists—those who study fossil evidence of past life—all over the world. It's hard to believe that six fossil teeth found there could demonstrate that primates existed at a much earlier stage in mammalian evolution than previously thought. What did these early primates look like? What was their role? How did these tiny, furry creatures survive in the world of the dinosaurs? To answer some of these questions, **David G. Conklin** and **G. Wesley Burnett** joined the research team exploring the area. Conklin was so intrigued he returned again to pay his respects to the little primate, *Purgatorius unio*. For a look into man's origins, to a time past where small, unpretentious creatures lived and died, turn to "The Bones of Purgatory" on page 24. Conklin is the department's parks manager for the Miles City region. Burnett is an assistant professor in the Department of Recreation and Park Administration at Clemson University in South Carolina. He was formerly chief of the Bureau of Planning and Project Administration in the department's Parks Division.

"Resources in Conflict" is an apt title for an article about the Rocky Mountain Front. As **Gary Olson** emphasizes, the foremost question is perhaps: "How will energy exploration affect the wildlife and aesthetic resources of the Rocky Mountain Front—and the hunters, fishermen, campers, photographers and others who enjoy them? Can we live with oil and gas activity in an area where wildlife and wilderness values are so high?" The area's history, its wildlife and its quiet beauty must all be considered before arriving at any final answers. Olson is a wildlife biologist working for the department in the Conrad area. Turn to his article on page 27.

George Drouillard was one who gave his life in the opening of Montana and the West. His story is interwoven with those of Lewis and Clark and their expedition, with Montana's fur trade and Manuel Lisa, with John Colter. In 1978, the department purchased a site which gives fishing access to the Jefferson River and also provides an opportunity to perpetuate the memory of Drouillard—near where he first ascended the river with Lewis and Clark and not far from the spot where he last set his traps and faced the wrath of the Blackfeet. Appropriately, the fishing access site was named for him. Turn to "The Saga of George Drouillard" on page 33. **Dick Ellis**, the department's parks manager for the Bozeman region, once again meshes his writing skills with his long-abiding interest in Montana's history.

Montana has no brood stock in any hatchery nor does it have a population of pure strain goldens set aside solely as an egg source. The 10 lake systems with pure strain goldens of unquestionable origin could provide future goldens. For admirers of golden trout, this is important because in 1939, the California Legislature placed an embargo on shipments of golden trout outside California.

The golden trout's color is no doubt its most outstanding characteristic. No wonder taxonomists speculated about the fish's evolution: Color varies among individuals from different waters, but can also vary between individual fish from the same water. These subtle differences were noted by Henshaw in 1878, before goldens were introduced into lakes. In lakes, the younger fish show the spotting and coloring of the "typical" golden, while older fish lose the 10-12 crossbars (parr marks) along their sides. In older fish, the lateral line often becomes bright crimson. During spawning, the whole side of the fish below the lateral line may turn crimson. The golden's flesh varies from yellowish to pink, but it is most often pink, firm and somewhat oily.

Goldens reproduce in the spring just as ice leaves the lakes. In some alpine lakes, this may be late in summer. Studies in the Beartooth Mountains and in other areas suggest that most successful spawning occurs in outlets where warmer waters exist during the early part of the season. Females usually spawn for the first time when they are 3 or 4 years old; they lay 50-1,750 eggs, depending on their size and number of times they previously spawned. Clean, unclogged streambed gravels of fist size and smaller are essential to successful spawning.

Three researchers have investigated feeding habits of golden trout (Brian Curtis, 1934, and the team of Paul Needham and E. H. Vestal, 1938). Their information was gathered in summer when goldens were feeding on surface organisms. In an effort to learn more about golden trout in Montana waters, I studied their feeding habits in six mountain lakes. The goldens I observed showed some dramatic shifts in eating habits: From the time ice left the lakes until spawning was complete, they were opportunists, feeding freely on available foods. Then, a shift occurred—in large lakes I no longer saw fish rising for food or cruising shorelines. They became bottom dwellers and fed mostly on larger insects occupying the lower depths. More amazing was their disinterest in zooplankton (small aquatic organisms which live in open lake water), typically the bread and butter of fish living most of their lives under ice and snow.

Because of the apparent lack of fish activity and the teeming masses of zooplankton, many sportsmen reported that lakes supporting golden trout were fishless and asked the Department of Fish, Wildlife and Parks to stock them. Often, that was done. Eventually, the new fish produced a sport fishery and the unsuspected population of golden trout was phased out because of its inability to compete for food and space or through hybridization with other spring spawning trout.

In Montana, eggs hatch and yolk-bearing fry emerge from the streambed in early September. They are about 1.2 inches long. By the time the yolk sac is absorbed, the fry is actively feeding and just getting started in life when the bounty of its new world diminishes. Its home darkens under ice and snow. When the ice goes off, they have grown to about 3.5 inches. As 2-year olds, they average 7.5 inches, 9.5 inches as 3-year olds and 11.5 inches as 6-year old fish.

In California, golden trout are reported to live six or seven years. Three Montana lakes supported goldens known to have lived to the ripe old age of 14. These fish averaged 16 inches and even as senior citizens were capable of successful reproduction. The lakes, however, lacked suitable spawning areas.

The largest golden on record was an 11-pound fish taken in 1948 from Cook Lakes, Wyo. As a contrast, the largest specimen among the 14-year olds taken by fisheries researchers in Montana was 18.2 inches long and weighed 2.38 pounds. During trapping activities in a lake in the Beartooth Range, one very large female was handled in 1975. Unfortunately, no official weight was recorded, but the fish exceeded 10 pounds and measured 26 inches. The state record golden weighed 2 pounds, 9 ounces, and was caught in 1975 in Lightning Lake.

Col. Stevens' sawmill on Cottonwood Creek is now a pile of decaying timbers, but his transplant of golden trout lives on throughout the West. ■

Situated at the base of Granite Mountain, two small communities—Rumsey and Clark—each had a large stamp mill. The most impressive was the huge, bimetallic, 100-stamp mill at Clark (above), built to process ore from Granite. Stair stepping down the mountain, the multistoried structure was an imposing sight, with its twin masonry stacks silhouetted against the sky. It was burned in 1967 (inset); now only the stacks and masonry foundation remain (photos: John DeHaas, Jr.).

Montana's Fabulous Ghost Towns

by John DeHaas, Jr.

graphics by Kevin Heaney

PROBABLY the most fascinating era of Montana's history is that unsettled period before and immediately following statehood: the mining era. Man's struggle for riches; a new lifestyle; a constant battle against the elements in a harsh land; the real (and sometimes imagined) danger from Indians, claim jumpers, road agents and gamblers; merchants whose prices were often beyond belief, and, far too often, the failure to find the dreamed-of fortune were all factors that shaped life in the northern Rockies.

A vast area, this land known as the Montana Territory had much mineral wealth to offer to those who had the fortitude and luck to locate its precious metals. And come the seekers of wealth did, from all parts of a young nation, as well as from abroad. They came from Vermont, New York, Pennsylvania, Virginia, Georgia and Texas. They came from Ireland, Germany, Wales, Norway and other Scandinavian countries, Slovakian countries and from China. Their numbers included loyal Unionites, Southern sympathizers and deserters from both armies, for the nation was torn apart in the early 1860s by the Civil War. Captured Confederate soldiers were "banished to Montana," after pledging not to rejoin their Army. The post-Civil War years brought many

displaced or left flat broke by the war.

Others who came were prospectors who had not found their fortunes in the great strikes in Colorado or in the '49 Gold Rush to California. There were farmers, city dwellers, murderers and thieves, as well as men of the cloth. There were no military forces, no governments or law enforcement officers to repel the invaders. Those who resisted the white man's influx were nomads who had lived off the land and, in turn, respected it. The odds were stacked against these disunited natives.

Those who came left indelible marks on the virgin territory. Both early and late, many mining camps had sections called "Chinatown," "Finntown," "Germantown" or "Little Italy." Inevitably, conflicts, misunderstandings and prejudices arose.

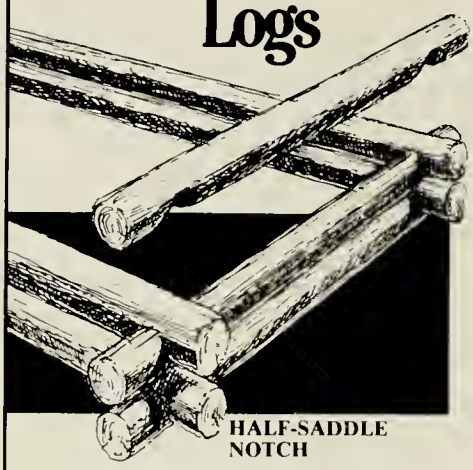
They arrived on foot, horseback or mule, driving an ox team or by steamboat up the Missouri River to Fort Benton. Later, after rails were laid, they came by train. Many left their families and loved ones behind, planning to send for them after fortunes were made. Some of them never saw those dear to them again.

The early settlements were crude and disorganized, offering few amenities. Those buildings essential to life were constructed first—log structures to provide shelter. Soon after came saloons, the basic source of food and drink, information and often a "stake" (financial backing for the prospector). Some saloons also provided sleeping accommodations. To meet the new community's demands, a blacksmith's shop, livery stable and a general store followed. Later, as the towns and camps became "tamed," partially because of the arrival of women and the birth of children, both churches and schools were demanded and built.

Supplies were often short and prices sometimes astronomical. Riots in towns short on food—such as the one in Virginia City in 1863—punctuated the period.

The seemingly endless precious metals were exhausted within a few months, or within a few years. The camps and towns were abandoned as their inhabitants followed rumors of other strikes. Many of these sites have literally disappeared. Others almost

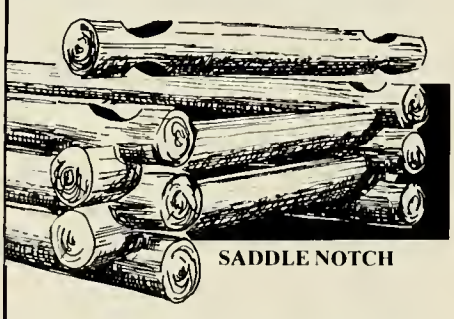
Logs



HALF-SADDLE NOTCH

At first glance, most log cabins appear similar. Yet distinct differences exist. In cabins built in the mining camps, various types of log notching can be found, as well as variations in the shapes of the logs used. Round logs were most common; the space between them was infilled with mud or clay from the stream banks. This chinking helped keep out the wind. Later, cement was mixed with the clay to form a harder infilling. In more careful construction, the tops and bottoms of the logs were hand-hewn or shaped with an ax to make the surfaces flat, thus ensuring a better fit. In other cases, the logs were hewn to a square or rectangular cross section, much like a railroad tie.

Log notching reflected not only the shape of the log, but also the builder's ethnic background. A common technique used for round logs was saddle notching (which resembles the "Lincoln Log" child's toy). This technique was

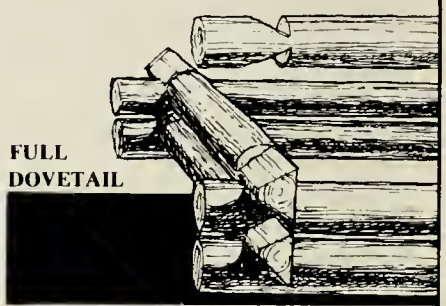


SADDLE NOTCH

used in constructing the Bannack jail. A variation of this, also used on round logs, was half notching, in which a notch was cut on either the top or bottom of the log, but not both. The blockhouse at Fort Logan exhibits the half-notching technique. Hewn logs were often put up using either the half-notching technique or the half dovetail. Examples of the half dovetail can be found in Bannack as well as on the St. Mary's Mission Church in Stevensville.

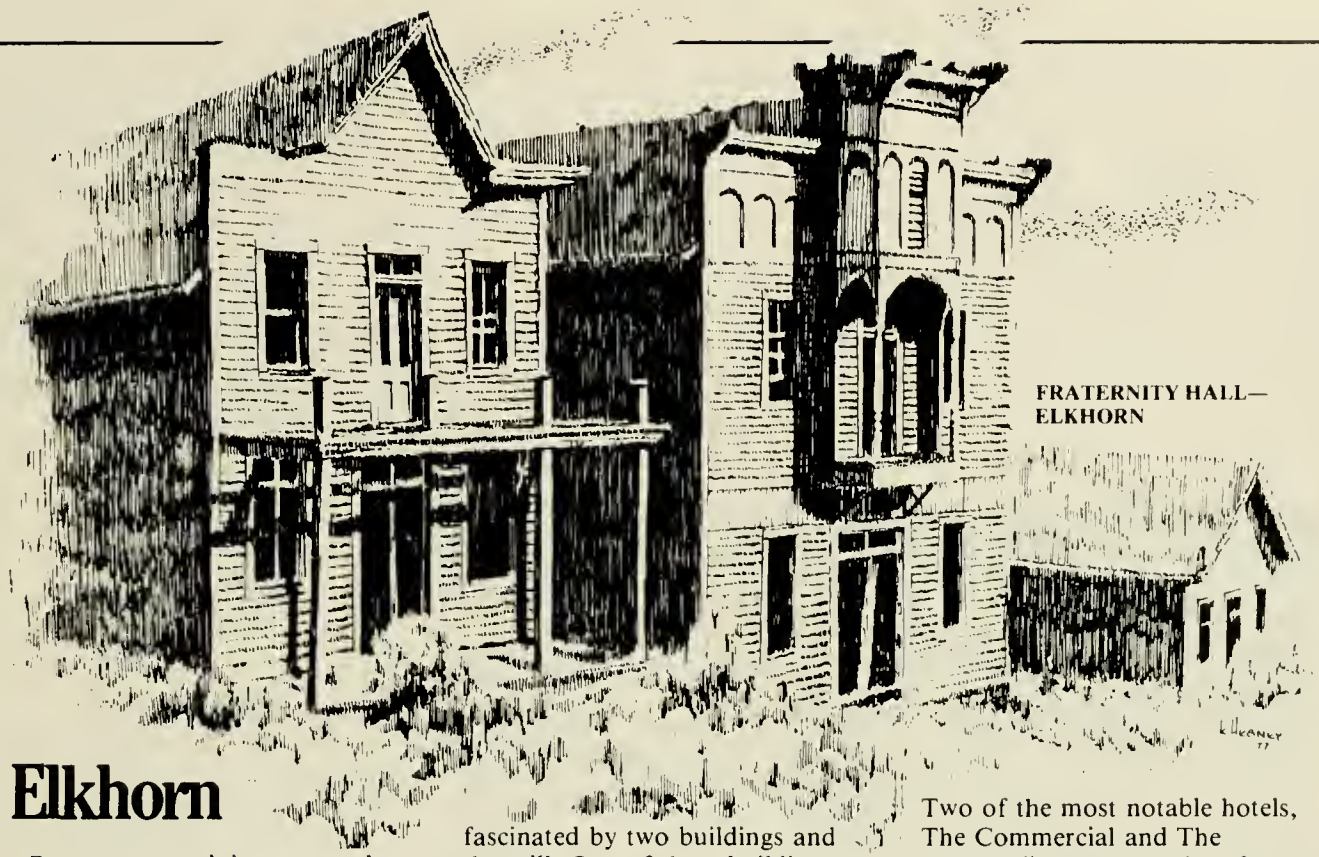
As soon as a sawmill could be built, cut lumber—siding, studs, joists, beams and planking—was available, enabling builders to proceed more rapidly and easily. The structures were built without sheathing beneath the siding and there was no time for the lumber to cure or dry properly, so the siding would shrink and air would enter.

Of course, builders didn't use



FULL DOVETAIL

insulation in these frame buildings and interior walls were often covered with newspaper or wallpaper over a canvas or burlap backing. In a letter to his family in Utica, N.Y., a minister stationed in the silver mining camp of Granite in 1889 described the experience of watching the walls (wallpaper) billow and undulate as a strong wind blew through his rented room. He even saw the rug lift off the floor. This not-so-pleasant experience has been confirmed in discussions with former extension employees of Montana State University who recalled similar happenings when spending the night in the old hotel at Norris. The two-story frame structure, now gone, lacked both sheathing and insulation beneath the siding; when the wind blew, it came through the walls and it was common to retire for the night with one's clothing on. These latter experiences in the Norris Hotel occurred in the first half of this century.



FRATERNITY HALL—
ELKHORN

Elkhorn

Between two mining camps that thrived and became cities—Butte and Helena—lies Boulder, present-day county seat of Jefferson County. Boulder was the hub of a large mining district and a few of its numerous mining camps still live on; others have been deserted for years or have entirely vanished. Today, only one brick stack of the original three stands at the site of the large mill at Wickes. Other camps in the region included Gregory, where the first mill was built; Corbin, Clancy, Jefferson City, Lump City, Comet, Cataract and Basin. But probably the most famous of these is Elkhorn, due east of Boulder.

Peter Wye discovered the Elkhorn Mine about 1870, but the yield did not warrant full operation until the 1880s. Gold and silver mining peaked here in the 1890s, so Elkhorn is one of Montana's later mining camps. Reportedly, the town had 2,500 residents, while 500 woodcutters, mostly French and Norwegian, were employed in the area and supplied wood for the town and the mill.

When I first visited Elkhorn in the early 1960s, I was particularly fascinated by two buildings and the mill. One of these buildings, situated on the north side of Main Street, housed a two-lane bowling alley. The lanes were delineated by long boards laid lengthwise in the building.

Across the street stands Fraternity Hall—probably the most photographed structure in any of Montana's ghost towns. The two-story frame building has a large hall on the first floor, with a raised stage at the rear. Social events, Christmas programs, high school graduation and plays were conducted here. The second floor contains small anterooms and a large hall used for lodge meetings and dances. Of special interest is the exterior balcony projecting from the second floor. The balcony is centrally located and extends up and above the cornice of the false-fronted structure. The front facade presents an unusual but pleasing composition with the balcony and its arches.

Next to Fraternity Hall stands a two-story frame building with a porch across the front. The building's first floor was a saloon, with a hotel on the second. Across Main Street and farther up the hill stood rooming houses and hotels. Two of the most notable hotels, The Commercial and The Metropolitan, were only a few doors apart. Adjacent buildings were rooming houses, saloons and a barber/bath building. The Hotel Elkhorn stood on the upper end of the block from Fraternity Hall. Main Street continued up past the mill, then curved back on itself as it climbed to the top of the hill where the Elkhorn graveyard is found.

Although it was a relatively late camp, Elkhorn lacks the more permanent structures of brick or stone found in Virginia City and Marysville. Today, fewer than 50 buildings remain. The bowling alley and mill are both gone and one of the hotels has lost its porch. Each year, nature does a little more damage. But this is slow, while fire and man's destruction are rapid. Most of the artifacts in the buildings disappeared long ago, only to surface in antique shops. Even doorknobs and cast iron hinges have been taken from Elkhorn's buildings, as well as from buildings in other ghost towns. I can only urge visitors to let what is there stay so that others might yet enjoy the flavor of a bygone chapter in Montana's history.

died, but today still retain a few inhabitants. A few survived, or were revived in later years to live again, either temporarily or permanently.

A few of the mining camps that began like all the others survived these trying years and grew into prosperous cities; probably the most outstanding of these survivors are Butte and Helena. Communities such as Dillon, Philipsburg and Lewistown had a far more stable base than mining; they served as transportation terminals for the mining camps scattered in the nearby mountains.

Camps like Bannack, Montana City, Diamond City, Blackhawk, Blackpine, Hecla, Kendall, Cooledge, Elkhorn, Comet, Iron Rod, Iron Age, Silver City, Hassel, Maiden, Gilt Edge, Landusky, Zortman and a hundred others were a colorful part of Montana.

In my travels, I have met families bringing their children and grandchildren to see the mining camp where a grandparent or great-grandparent had lived and worked. They often say something like, "We wanted the children to see this town before it disappeared completely."

It is impossible to know what will be left for future generations. My hope is that the reader will explore and enjoy the numerous mining camps almost in his or her backyard. Leave what remains intact; instead, take away with you a memory, a sketch, photograph or movie. These can be enjoyed by you and your family and friends for years to come. Let the rest stay there for others to enjoy.

An interesting development of the mining era was the various charcoal kilns, remains of which can be seen near Clancy, Wolf Creek and Jefferson City. The kilns pictured here are at Melrose, on Canyon Creek between Glendale and Divide. Clustered together, they have an almost villagelike appearance. It is quite an experience to view these beautifully constructed kilns—they stand 15-20 feet high, with a pointed arch opening approximately six feet high. One can but speculate on the difficulty involved in transporting material and craftsmen to such remote locations. Stepping inside a charcoal kiln is a treat in itself. The walls are blackened and the backyard barbeque smell still remains (photo: John DeHaas, Jr.).

First came gold and silver, then copper and coal. Towns or mining camps such as Chestnut, Storrs, Aldrich, Timberline and Electric (originally known as Horr) were coal mining camps. Of special interest is the serpentine rock work serving as support and openings for many of the brick coke ovens. Ruins of coke ovens can be seen up Trail Creek or at Cokedale, both situated east of Bozeman; the ovens at Electric are pictured here (photo: John DeHaas, Jr.).

Marysville

MAIN STREET—MARYSVILLE

The history of Marysville, 17 miles northwest of Helena, is closely associated with Thomas Cruse, who arrived in the Silver Creek area in 1868. Here, he worked a placer claim and speculated on the vein of ore farther up the mountain. He sank a tunnel on what was later to be named Marysville Mountain and filed a claim Jan. 1, 1876. He named his mine the Drumlummon, after the parish in which he was born in Ireland. Cruse worked his mine for only six years and then sold out to an English company for $1.5 million. The new owners expanded the operation and the Drumlummon became Montana's greatest producer, paying $15 million in dividends to its stockholders.

Cruse moved to Helena where he established a bank; he also contributed generously to the building fund for the Cathedral of St. Helena. He purchased Capitol Building bonds when nobody else would. These are impressive accomplishments—more so when you consider Cruse was illiterate and his wife had taught him to write his own name.

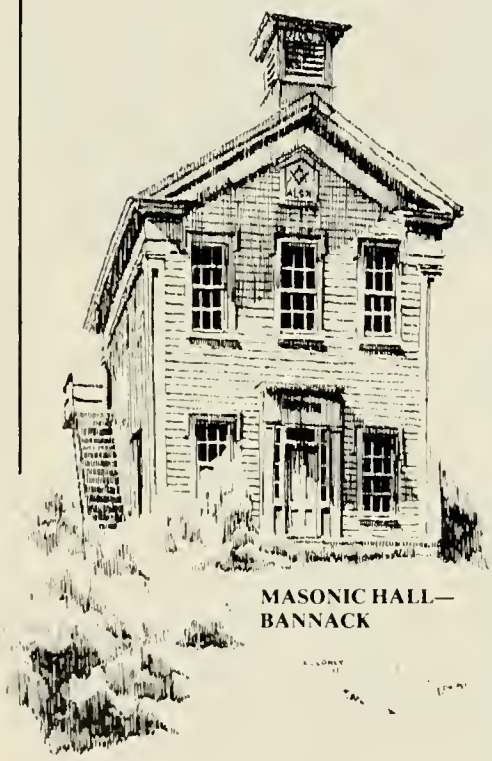
In 1887—at the peak of production for the mines in and around Marysville—the Northern Pacific and the Great Northern railroads competed to see which could first reach Marysville with a rail line from Helena. Northern Pacific succeeded and entered Marysville on a large curved trestle. A train depot was constructed on Second Street and the main Northern Pacific line and three sidetracks were situated on the north side of the depot. All of the lines terminated in a turntable on the west side of Main Street. The depot, tracks, turntable and trestle are all gone.

Gone, too, are the wooden two-story Bon Ton House and other rooming houses on Main Street, saloons, drug stores, a grocery, a meat market, offices, a bakery and the masonry McKenrick Block that occupied the corner of First and Main streets. Also gone from the west side of Main Street are Dillon's Livery, an opera house and a dentist's office.

The Drumlummon Mining Corp., Ltd., built a 50-stamp mill in Marysville in 1884; in 1886, the company built a 60-stamp mill nearby. Both mills are now gone; the last was destroyed by arson in 1971.

Marysville's two churches, Methodist (see illustration in "The Editor's Column") and Catholic, still stand. They are both in the same block, facing west onto Grand Street. Across the street stood a two-story wooden public school. Fire damaged part of the building and it is now a one-story structure used as a museum. Although many vacant and deserted buildings remain in Marysville, the town still has permanent residents.

HOTEL MEADE—
BANNACK



MASONIC HALL—
BANNACK

Bannack

Life was difficult in the early mining camps. A letter from a woman who spent the winter of 1862-63 in Bannack with her husband probably best described life in the new town—a place with no church, no local government and no law and order. She wrote of having a two-room log cabin, a building more elaborate than others in the area, built at a cost of $400. She told also of her desire to have a wood floor and a cookstove, but was proud she had learned to cook in the fireplace.

At that time, Bannack was booming. It became the first seat of government for the newly created Montana Territory, a distinction it lost the following year to Virginia City. Even though the great strike in the Alder Gulch area drained away many of Bannack's inhabitants, Bannack continued to develop.

In 1874, a two-story frame structure was built to house an odd pair of neighbors. Masonic Lodge No. 16, A.F.&A.M., occupied the second floor, with access gained to the lodge room by an outside staircase. The first floor housed a one-room public school with cloakrooms—one for boys and one for girls—flanking the entrance door.

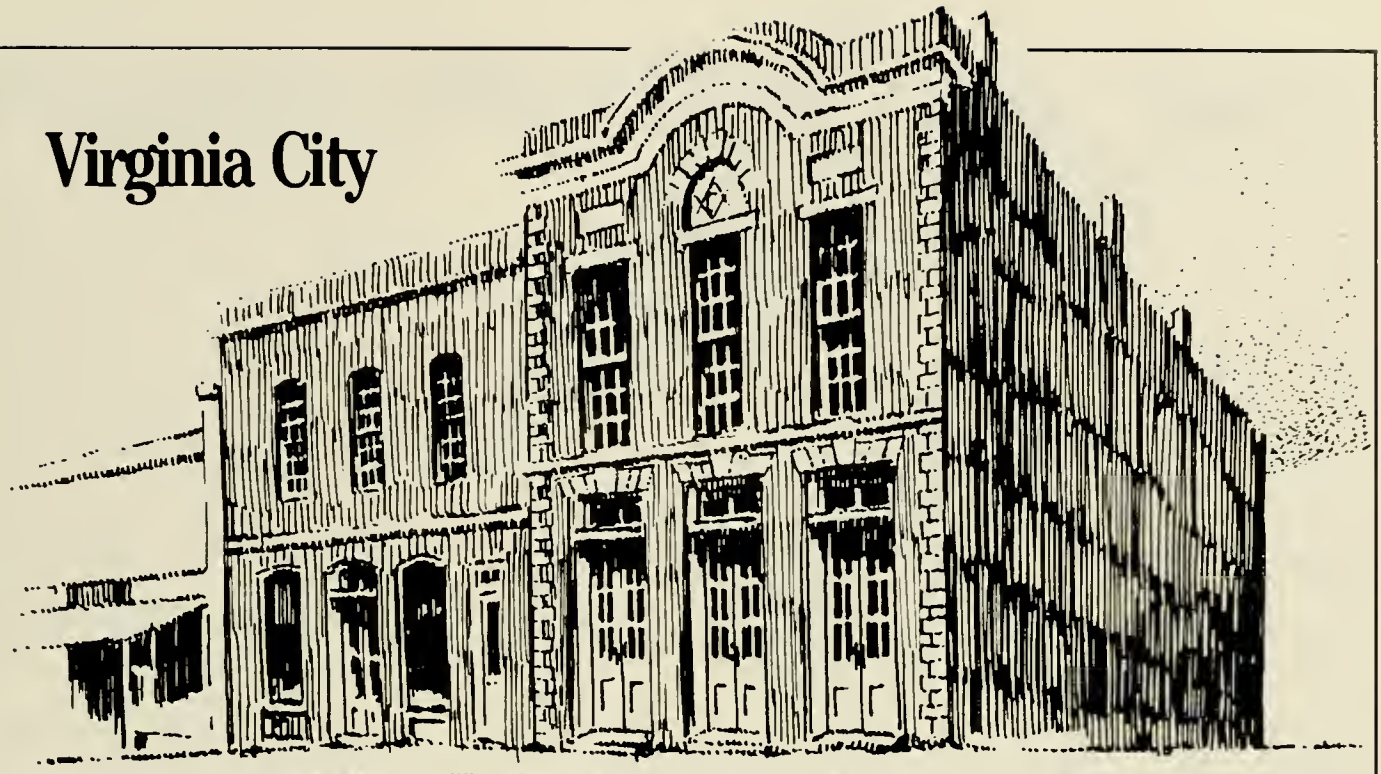
Another noteworthy building in the town is the "Carpenter Gothic" Church. This small frame building was constructed in 1877 by the Methodist circuit rider minister, W. W. "Brother Van" Van Orsdel, when townspeople feared attack by Chief Joseph. A two-story masonry courthouse had been built in 1876 to serve as headquarters for Beaverhead County government and it was here Bannack's women and children sought shelter during the emergency. Bannack lost the county seat to nearby Dillon in 1881; the courthouse became the Meade Hotel and served in this capacity for many years.

Mining continued on a reduced scale in Bannack until the late 1890s when the dredge boats reworked Grasshopper Creek and the town experienced another brief boom period.

Many buildings have disappeared, but enough remain to suggest what the town was once like. Bannack is a National Historic Landmark, and a state park supervised by the Department of Fish, Wildlife and Parks. Both federal and state monies have gone into acquisition of privately owned property in the town, as well as for stabilization of some buildings and restoration of others.

To walk the dusty streets, smell the sagebrush and visually explore an early mining camp that has been maintained—but not converted into a commercial venture—is a real treat. The easily accessible historic site is a "must" for Montanans and visitors alike.

Virginia City



MASONIC HALL—VIRGINIA CITY

kpHEANEY 191 ©

A small group of prospectors made the second "big strike" in southwestern Montana, this time in Alder Gulch. The find was made in early June, 1863, and caused a stampede from Bannack when word of "color in the pan" reached it. Temporary shelters were quickly thrown up along Alder Creek. A miners' meeting was conducted and a committee appointed to work out the rules and regulations for this new mining district. The gulch's population was to swell to about 10,000 persons within a year.

Although Virginia City, the biggest town in Alder Gulch, held and then lost the distinction of being capital of the Montana Territory, it became—and still is—the seat of Madison County. A large elaborate courthouse was constructed in 1875 (see back cover) and it is the oldest courthouse still in use in Montana. The handsome brick structure was designed by Loren B. Olds, the architect who also designed the Beaverhead County Courthouse at Bannack.

Virginia City has been more fortunate than Bannack, because it lived on even after most of its residents went off to seek their fortunes elsewhere. Many fine examples of masonry structures can be found here—for instance, the Livery Stable on Wallace Street, Viginina City's main thoroughfare. Built in 1863 as a store, it probably was the first stone structure in the growing mining camp. The vigilantes are reputed to have met here following their organization in 1863.

Another noteworthy building is the two-story stone Masonic Temple, built in 1867. Public records reveal the Masonic Lodge was recessed several times to allow members to participate in vigilante actions. However, not all vigilantes were Masons, as Thomas J. Dimsdale wrote in "The Vigilantes of Montana": "Merchants, miners, mechanics and professional men alike joined in the movement." Such citizen response was no doubt necessary in a rough and hard time when lawmen, such as Sheriff Henry Plummer and his deputies, were themselves road agents, thieves and murderers.

Life was raw and tough in these camps and pleasures were sought in saloons and from sporting events. Boxing was extremely popular and both Virginia City and Helena hosted numerous contests. Records indicate there were six professional fighters in Virginia City in 1864-65. One of them, John Condle "Con" Orem, claimed to be an American champion. In one of the world's longest fights, Orem fought Hugh O'Neil—who was four inches taller and 42 pounds heavier—to a draw. Conducted the afternoon of Jan. 2, 1865, the fight lasted more than 5½ hours and went 185 rounds. The next year, the two men again fought, this time in Helena, and Orem was the winner after 90 rounds.

Among its miners, merchants and adventurers, Virginia City had a number of well-educated citizens, like Dimsdale, editor of the Montana Post, and Col. Wilbur Fisk Sanders, a lawyer who became a vigilante, legislator, businessman and politician with a national reputation. Col. Sanders served as prosecuting attorney at the Dec. 21, 1863, trial of George Ives, one of the most notorious members of Plummer's gang. Later, he built a fine one-and-one-half story frame house on Idaho Street for his bride.

Granite

MINER'S UNION HALL—GRANITE

Known as the "Silver Queen City of the West," Granite, a few miles southeast of Philipsburg, was a bustling town in the late 1880s and early '90s. Silver had been discovered around Philipsburg in 1865, but it was not until 1875 that the Granite Mountain lode claim was filed. And it was not until November 1882 that expanded exploration, financed by St. Louis investors, revealed the rich silver bonanza. By 1892, Granite's population was between 2,500-3,000 persons, while the nearby communities of Rumsey and Hasmark were believed to have a combined population that large.

In summer 1888, the Granite Miner's Union was organized and on June 13, 1889, a Miner's Union parade was conducted, followed by a ball in the Knights of Labor Hall celebrating the Union's first anniversary. Union members made plans to build their own hall on the upper part of Main Street and the handsome, three-story masonry structure was dedicated on New Year's Eve—Dec. 31, 1890. A "Grand Dedication Ball" was held, with "an invitation to the public, tickets admitting Gents & Ladies, $3.00."

Of interest is a portion of the dedication speech made by Union President James A. Gilfillan: "The Union does not debate politics, religion or public opinion in their hall, and their meetings are confined strictly to the interests of the working men."

The first story was constructed of native granite and the upper two floors of red brick. The building was set into the hillside. From the raised stage in the main auditorium on the second floor, a door led out to grade level of the hillside. There were no fixed seats, since the auditorium was also used for dances and its maple "spring floor" was reportedly among the very best. Concerts, theatrical performances and other celebrations made the building the town's social center. The building had a decorative cast iron cornice, columns and pier covers, as well as small square panes of colored glass in the transom windows of the first floor.

In the 1890s, a series of wooden buildings, ranging from one to three stories, flanked the Miner's Union Hall. These were rooming houses, saloons, restaurants and one saloon/gambling/lunchroom. Across the street stood a small metal building that housed the Granite Mountain Star, a weekly newspaper. In the gully behind the Star was Chinatown. Also in this general area were several "female boarding houses." These structures are now gone, as are the Episcopal and Presbyterian churches. Most of the streets have disappeared and their names—Elk, Broadway, Bell—are but traces on old maps.

Magnolia Avenue can still be found; however, it is impossible not to speculate as to how a street of that name came to be situated on top of Granite Mountain. Was someone longing for a Southern home? A few wooden dwellings remain on Magnolia, along with Granite's only stone house. Constructed before 1889, it has a steep gable roof and dormers. An outside staircase at the rear of the building led to a platform that connected the doorway of the upper level with the hillside and road above. There was no interior connection with the ground floor. The house was built for Thomas A. Weir, superintendent of the Granite Mountain Mining Co. Weir came to Granite from Leadville, Colo. He was a deeply religious man, active in his church, and instigated many changes in mining operations to improve safety and working conditions for miners. He also inaugurated a six-day work week for the Granite crews.

The Montana Ghost Town Preservation Society obtained title to the Miner's Union Hall and the mill superintendent's house from the Antonioli family and presented the buildings to the Recreation and Parks Division (now Parks Division) of the Department of Fish and Game (now Department of Fish, Wildlife and Parks) in 1974. Unfortunately, a series of hard winters took their toll and the Miner's Union Hall now lies in ruin, testimony to the old saying "Too little and too late" in the story of preservation.

The once-prosperous silver mining camp of Granite collapsed with the Silver Panic of 1893. A brief period of revival occurred, but Granite never recovered. Today, little physical evidence remains of the numerous homes, saloons, rooming houses, barber shops, blacksmith shops and hotels with colorful names such as The Metropolitan, The California, The Ruby and The St. Louis Lodge.■

Readers Respond

May/June Beauties Identified

I, like the editor, have resolved to learn the names of Montana's wildflowers (as he mentioned in the May/June 1980 "The Editor's Column").

However, you provided no assistance to me with my spring resolution because you failed to identify the wildflower photographs in your May/June edition. I visually enjoyed the photographs, but identification of these beauties would have been informative and helped others who have resolved at some time to learn the names of Montana's wildflowers.—*Barbara Kosa; Dillon, Mont.*

* * * * *

The editor's resolution to learn the names of Montana's wildflowers was good. He must have carried it out quickly—and assumed that everybody else did, too—because you didn't name those beauties that the May/June 1980 issue of *Montana Outdoors* showed. It's fine to give photographers credit, but the rest of us love to know what, where and even who is in the picture!

We still love Montana, having lived in the Judith Basin and the Bitterroot. And we love that magazine you put out. We ordered several extra copies of your Special Hunting Issue just to give away to folks here. Keep up the good work, but do give us the names of those wildflowers, please.—*Larry Roumpf; Baker, Ore.*

* * * * *

I want to commend you on the beautiful wildflowers pictured in your May/-June 1980 magazine. But I feel sad when you put such beautiful pictures of Montana's outdoors in your magazine without identifying them. It is very frustrating to your readers and it would certainly be a big improvement to your magazine to identify the wildflowers.—*Pansy Miles; Superior, Mont.*

* * * * *

May I quote from the "Editor's Column" in the May/June 1980 issue?: "I hereby resolve to learn the names of Montana's wildflowers. . . ."

The issue contains nine pages of beautiful photographs of wildflowers. Nowhere in the issue is there any identification of the flowers pictured. Don't you think you have shortchanged your readers? Even if the editor does not know the identity of the flowers pictured, there must be someone in Montana who does.

I would appreciate it if you would put a small note in the next issue identifying the flowers pictured in the May/June issue. I get up to Montana every couple of years and enjoy the beauty of your state, including its wildflowers. Please let me know what they are.—*Oren W. Bryant; Tucson, Ariz.*

* * * * *

•*As the May/June issue went to press, the editor had mastered only five of the 10 flowers pictured. We wanted to wait until he was able to provide the names of* all *flowers pictured, and he now swears he is able to do so. The flowers, in order of their appearance:*

Fairyslipper, *Calypso bulbosa* (by Dean E. Biggins)

Bitterroot, *Lewisia rediviva* (by Danny On)

Sego lily, *Calochortus nuttallii* (by Mike Aderhold)

Pasqueflower, *Anemone nuttalliana* (by Larry Thompson)

Mountain hollyhock, *Iliamna rivularis* (by H. Peder Waldum)

Harebell, *Campanula rotundifolia* (by Thomas Maurer)

Dogtooth violet, *Erythronium grandiflorum* (by Tony C. Caprio)

Silky phacelia, *Phacelia sericea* (by Dean E. Biggins)

Beargrass, *Xerophyllum tenax* (by Sue Thompson)

Red monkeyflower, *Mimulus lewisii* (by George Wuerthner)

—*Montana Outdoors Staff*

Audubon Sighting?

In reading Ken Walcheck's article about Audubon bighorn sheep (*Montana Outdoors*, Jan./Feb. 1980), I was reminded of an interesting tale. In 1976, while hunting along the Powder River west of Biddle, Mont., my sons and I observed a bighorn sheep of the Audubon size and color standing close to the top of a red butte. We watched the animal for quite a while, through binoculars and gun sights at about 1,500 yards or less. We were hunting with Thomas Wetherelt of Bell Creek and Biddle; he said he has lived among the buttes all of his life and he had never seen an animal like this before.

At first, I thought it was an albino deer, but no deer has bighorn curls—and this animal had almost perfect full curls.

Now it is possible a ram could have come out of the mountains of Wyoming and into the buttes. But this animal was not as large as the regular bighorns and also much lighter in color.—*Gordon Suk; Rochester, Minn.*

* * * * *

•*Bighorn sheep were planted along the Powder River in 1958 and in 1975. It is possible the bighorn you saw came from these plants.*—Ed.

Pros and Cons

I am writing in response to a letter, "Magazine Lacks Objectivity," which appeared in your March/April 1980 issue. I'm sure all sportsmen must commend your efforts to preserve wilderness and wildlife habitat. The many road closures in the Flathead area have definitely been an improvement and have resulted in wildlife returning to areas that had been abandoned by them due to man's encroachment. Limited access to areas is a step in the right direction.

I'm sure we all realize the importance of the lumber industry and its vast potential to Montanans. It contributes to wildlife management as well, providing new growth areas for food and cover.

Remember, we have only so much land to use. Let's use it wisely.—*Ken Gordon; Columbia Falls, Mont.*

* * * * *

We are not renewing our subscription to *Montana Outdoors* this year and wanted to tell you why. We enjoy keeping in touch with Montana and think your photography is just tops. However, we have a real problem with your journalistic morality.

The impression we get from many of your articles is that you are preaching to us. We're concerned about the environment, but most of your articles are so slanted that they leave no room for independent thought, much less the opposing view.

We feel that when articles are written, you should give the facts—pro and con—and nothing else. Put personal views where they belong: on the editorial page.—*Mike and Jane Washington; Aurora, Colo.*

RECYCLED PAPER

The Bones Of Purgatory

by David G. Conklin and G. Wesley Burnett

A SCORCHING SUMMER day in the badlands of eastern Montana. The short grass prairie is bone dry and the black- and grey-banded buttes glisten like chrome under the relentless sun. Today it is easy to understand how places like Hell Creek, Bone Bluff, Devil Point and the Big Dry were named.

It is 1964, and two scientists are wandering the breaks and prairies east of Fort Peck Reservior, searching for the fossilized bones of a 70-million-year-old dinosaur. They have every reason to expect they will find what they are looking for. After all, the badlands of eastern Montana are renowned by paleontologists (scientists who study fossil evidence of past life) all over the world.

Fossil dinosaurs have been found simply lying about the countryside in this area. Only a half dozen miles from where these scientists are now looking, a team from the American Museum of Natural History amazed the world in 1906 when it recovered remains of the largest, most ferocious, dinosaur ever to roam the earth, *Tyrannosaurus rex*, the "terrible lizard."

But today, Dr. Leigh Van Valen of the American Museum of Natural History (now at the University of Chicago) and Dr. Robert Sloan of the University of Minnesota will have their attention diverted by a discovery more important than the search for another "terrible lizard." The sweat drips from their foreheads and stings their eyes as they inch their way up a steep clay butte east of the Big Dry Arm of Fort Peck Reservoir. They appropriately christen the site: Purgatory Hill. As they rest near the top, they begin to scratch in a layer of silt containing fossilized bone and shell fragments, fragments which soon prove to be invaluable clues in the search for knowledge about man's distant past.

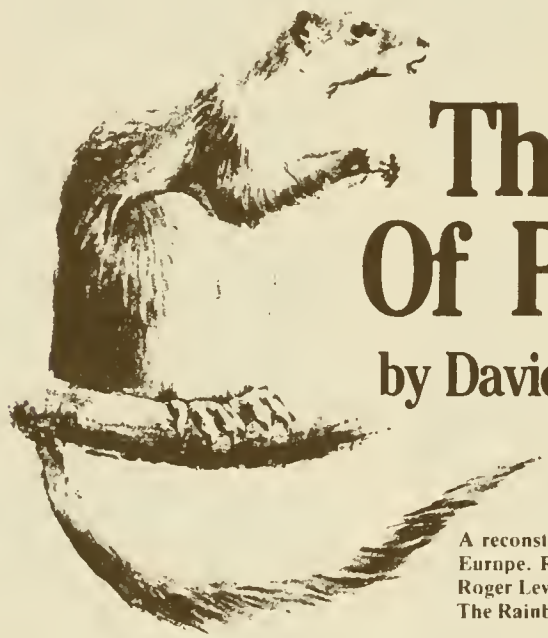
During the next two summers, Van Valen, Sloan and their student paleontologists removed over 15 tons of chalky rubble from Purgatory Hill. When sifted, washed and given an acid bath, it yielded six fossil teeth, each about the size of the head of a paper book match. Because teeth resist decomposition, they provide important clues about the past, including information about their former owner's habits and diet. These scientists did not discover teeth from a dinosaur, but from a 65-million-year-old primate from the group of mammals comprising monkeys, apes and man.

They named this creature *Purgatorius unio*, or the "clam bed Purgatorius." It demonstrated the mammals we call primates existed at a much earlier stage in mammalian evolution than previously thought—in fact, over five million years earlier. Later, they discovered an older *Purgatorius* fossil in the same rock formation as a dinosaur, testifying to the existence of primates during the age of the dinosaurs.

What did these earliest primates look like? What ecological role did they play? How did they survive the age of the "terrible lizard"? And why are they gone today?

In search of the answers to these questions, I rode with Dr. Sloan's academic posse over two years ago one drizzly May day through the badlands bordering Big Dry Arm of Fort Peck Reservoir.

"Imagine this landscape," Dr. Sloan said, "as it appeared when *Purgatorius* lived here 70 million years ago! Unlike today, it was a humid, tropical rain forest, roughly comparable to that of the Central American country of Honduras. The Gulf of Mexico was its eastern border, extending north nearly to the Arctic Circle. There were no hills nearby. The land was low and flat, dissected with meandering streams cutting new channels. The streams flowed predominantly northeast, arising from mountains near what is now Yellowstone National Park."



A reconstruction of a fossil descendant of Purgatorius, found in Europe. Reproduced from "Origins" by Richard E. Leakey and Roger Lewin (E. P. Dutton, New York 1977, by permission of The Rainbird Publishing Group, Ltd.).

This was the age of dinosaurs, and they were the dominant forms of life. Dinosaurs roamed the area. Like *Triceratops*, a lumbering three-horned plant eater which weighed eight to 10 tons and had a head more than seven feet long (see "Strange Beasts in Our Backyard" on page 2). Like *Tyrannosaurus rex*, the rare but efficient flesh-eating predator which stood 20 feet high and measured 50 feet long.

Dinosaurs lived to an average age of 25 years in this area and had a population density of one per square mile. But the mammal explosion had already begun. Mammals were anything but rare, outnumbering dinosaurs 300-to-1. But these small early mammals were no match for the gargantuan creatures who held the limelight, so they meekly went about their business as inobtrusively as possible.

There was little *Purgatorius*—a beady-eyed, bewhiskered long-snouted, chipmunk-sized primate, busily rifling through fallen leaves and undergrowth looking for insects, or almost anything edible. If he was smart, he fed at night and spent his days in a nest

or burrow trying to be inconspicuous.

Several mouselike mammals (called "multituberculates" because of their many conical teeth) were more common in this community than *Purgatorius*. I stood transfixed as I examined a fingernail-sized, 65-million-year-old jawbone of one of these animals collected by Dr. Sloan's students. It was hard to realize these "mice" were not only the most common, but also the most efficient, plant-eating mammals in North America at that time. Although they may have competed with dinosaurs for food, they also probably preferred to remain as inobtrusive as possible, by feeding only during the relative safety of night when the monsters were sleeping.

Primitive hoofed mammals—the first ungulates—also lived here. Although only about the size of a skunk, and still lacking true hoofs, their migrations would soon help fill the void left by the impending demise of the dinosaurs.

All of these small, obscure, warm-blooded, fur-covered creatures of the night had to be content with playing the understudy in the dramatic theater the Cretaceous tropics provided for the dinosaur. But the dinosaurs' extinction supplied the void necessary for their evolutionary eruption and heralded the birth of the mammalian age in the Tertiary period some 65 million years ago.

Several ecological factors changing over half a million years may be responsible for the extinction of the dinosaurs. As the warm inland sea retreated south toward the Gulf of Mexico, winters became more severe and the tropical rain forest disappeared. It was replaced by a more temperate woodland of evergreens and petrified remains of these trees can still be seen eroding from nearby buttes.

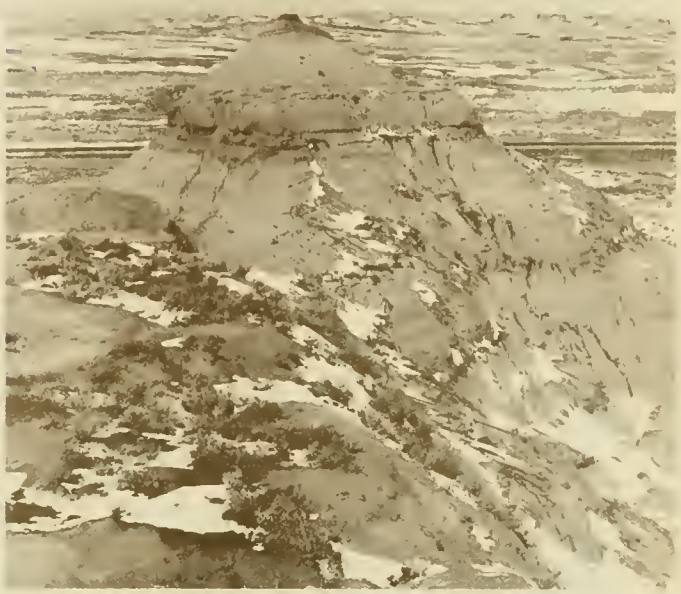
Perhaps the dinosaurs could not eat the new vegetation, or perhaps there was not enough of it available during winter. Possibly, disease, parasites, temperature or a hundred other things dealt the final blow. The number of offspring decreased and dinosaurs gradually disappeared. As John E. Pfeiffer suggested in his book, "The Emergence of Man," *Purgatorius* may have even acquired a taste for dinosaur eggs and pushed the huge beasts further down oblivion's road.

And what of *Purgatorius*? Was he, too, destined for extinction? Scientists recognize what every school child now accepts as obvious: that the similarity between the east coast of North America and the west coast of Europe is too great to be coincidence. By the 1960s, the theory of continental drift was becoming popular enough to be debated. Into the heat of this controversy came the primate from McCone County, Mont. Since North America has no primitive forms of primates today, how did it get here? The answer is obvious. Europe and North America were a single subtropical landmass which did not separate until primate evolution had begun.

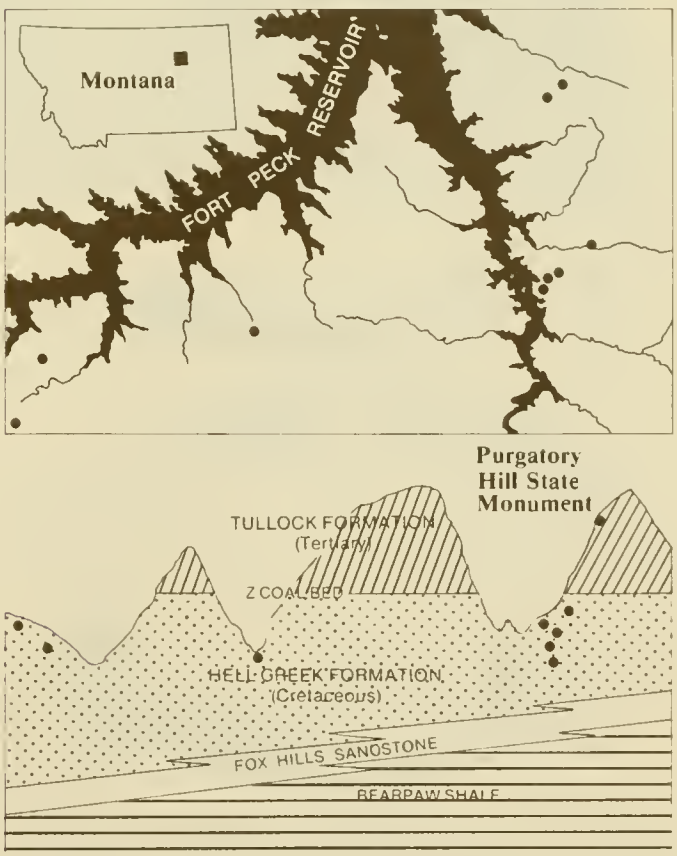
"By some 25 million years ago, the North American climate had become too cold for primates to survive," noted Dr. Sloan. The ancient link with Europe was by now long broken and North American descendants of *Purgatorius* did indeed become extinct. Fossil evidence of this last known North American descendant was found some years ago near Wounded Knee, S.D.

But in Europe his descendants trickled south, pursuing the sun into Asia and Africa. Other *Purgatorius* descendants from North America moved south into South America. In the process, the primates who survived began gradually edging toward "monkeyishness"—developing better eyesight, depth perception, color vision, fingers instead of claws, a larger brain and generally becoming larger. stronger, better coordinated and much more intelligent.

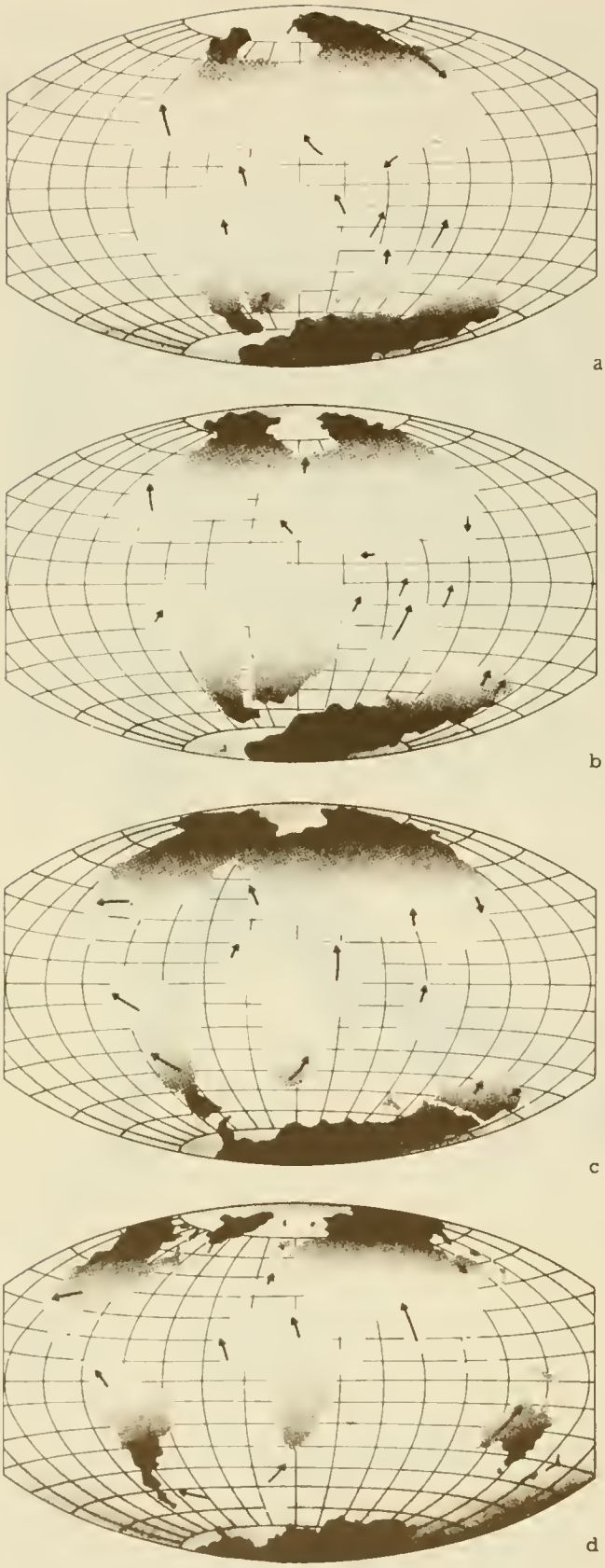
The hows, whens and wheres of primate evolution are still a topic of heated debate. But similarities between apes and man have been studied for over 2,000 years. Aristotle and Hippocrates recognized the similarity in the third and fourth centuries B.C. and Galen of Pergamum, the father of experimental physiology,



Purgatory Hill, located in the badlands of eastern Montana, has yielded many fossilized bone and shell fragments (DFWP photo: David G. Conklin).



The dots indicate paleontological sites near Fort Peck Reservoir which have produced mammal fossils important to the study of evolution (illustration courtesy of Dr. Robert E. Sloan).



Europe and North America were a single subtropical landmass which began to break up about 200 million years ago, after the primate evolution had begun. Reproduced from "Origins" by Richard E. Leakey and Roger Lewin (E. P. Dutton, New York 1977, by permission of The Rainbird Publishing Group, Ltd.).

wrote: "The ape is likest to man. . . ."

To demonstrate that evolution *did* occur—that the mammal-primate-ape-man sequence does exist—depends on finding the fossilized evidence of those intermediate types. Direct evidence of man's evolution cannot be based exclusively on studying creatures living today.

No wonder the bones of Purgatory are more than just museum fossils that stun the imagination. The geological record is so complete and undisturbed here that scientists have been able to reconstruct the living, working dynamics of ecosystems that existed over 60 million years ago. Estimates of biomass (the total live weight of the plants and animals in the community) and energy consumption by species have even been possible. Here, one can watch in amazing detail the demise of the dinosaur and early mammals and the step-by-step encroachment of new mammal communities into the vacant habitat.

Because of its importance, location and setting, Purgatory Hill was leased by the Department of Fish, Wildlife and Parks in February 1979 from the Department of State Lands for management as a state monument. Unfortunately, the site remains undeveloped. It is not open to the public and won't be until money is found for developing visitor facilities. The department is looking for assistance from various grant programs, foundations and private donors to help the monument achieve its potential. Only then can plans be drawn for a parking area, information signs, picnic facilities and a self-guided trail so visitors can watch paleontologists at work.

A little over a year ago, I again stopped at Purgatory Hill to climb its peak and pay my respects. As I began my ascent, I found a piece of petrified wood in the banded clays of what scientists call the Hell Creek Formation. Here was a piece of a tropical tree that lived and died over 70 million years ago! Farther up, I passed the Z coal bed, so called because it is the last coal bed separating mammal from dinosaur fossils. By now, 65 million years ago, the dinosaurs were dead. I increased my pace and soon climbed above two more coal beds, the Y and then the X.

I was now definitely in the "age of mammals." I climbed another 116 feet through the sand, shell and bone conglomerate of the Tullock Formation, to where that early primate *Purgatorius* met his maker. Although tired, my walk was nearly over and a few more steps brought me to the top of the primate pinnacle: Purgatory Hill.

My boots completely covered its tiny conical summit. The amphitheater below me was a profusion of bunchgrass, wildflowers and cap rocks shaped like giant mushrooms. But the most spectacular sight was the simple grandeur of the plains, the native prairie, an emerald green stretching for countless miles in all directions, broken only by the banded buttes of the badlands.

It seemed as if I could look into tomorrow. But I was beckoned back into yesterday, to the origins of man, to past eons when streams flowed through dense tropical forests, where small unpretentious creatures lived and died. Their remains, torn by swirls and eddies, were carried with silt and debris to a clam bed at a stream's delta. There, they accumulated, solidified and, in time, formed a dense conglomerate—the same conglomerate that persuaded two scientists to forsake their dinosaur hunt on that fateful day in 1964.

"What can be learned here?" I asked myself. I remembered the words of Dr. Sloan: "Perhaps the only moral is that in the long run such minor problems as pestilence, forest fires, floods, hurricanes or mosquitoes will not pose as great a problem to modern communities as unwitting tinkering with the structure and organization of the communities themselves." ■

RESOURCES IN CONFLICT

DFWP photo: David G. Conklin

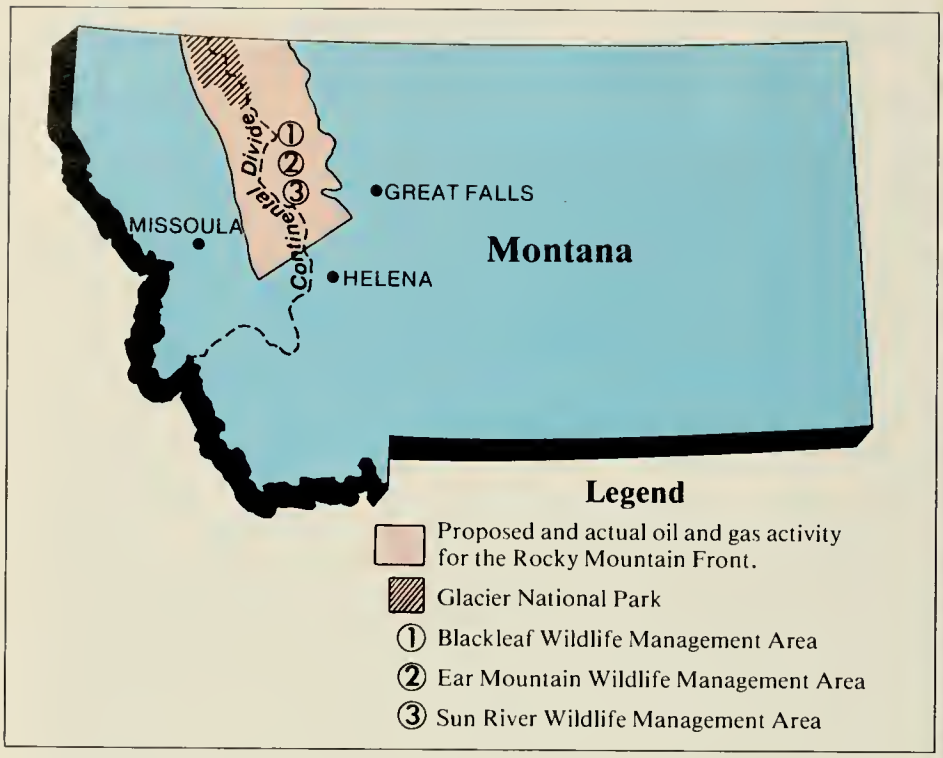
THE ROCKY MOUNTAIN FRONT

HISTORY

The written history of the Rocky Mountain Front began in June 1805, when the Lewis and Clark party viewed the northern Rockies from the Great Falls of the Missouri. For centuries before the arrival of the white man, however, several Indian tribes inhabited or traveled through the area. Travois ruts, trail markers and tipi rings are still visible today in the foothills along the Front, which formed a natural north-south travel route for trading and migration. Petroglyphs (paintings or inscriptions on rock) can be found in the Sun River Canyon, and buffalo jumps, or pishkuns, dot the cliffs overlooking the Teton River to the north.

The Kootenai, Salish and Flathead Indian tribes occupied the Front until about 1700, when the Blackfeet forced them west over the Continental Divide. The Blackfeet, Crow and Shoshone tribes vied for control of the area until about 1800, when the Blackfeet finally prevailed, extending their sphere of power up the Missouri to the Three Forks and beyond. The Blackfeet continued to dominate the Front during the first half of the 19th century, but as the white man's influence in the area grew steadily stronger, it soon became clear that the era of the Plains Indian was drawing to a close.

by Gary Olson



Cattle were introduced into the plains along the Front in 1862 and, as early as 1890, the foothill region was reportedly overgrazed. The first permanent settlements in the area—primarily on the larger streams and in the foothills—were near military forts and trading posts. The Sun River Cattle Company, the Woolman Ranch and Sheep Company, the Columbian Land Company of St. Paul and the Henningson Land Company were all active in the Sun River-Teton River area in the late 1800s. Other large ranch holdings dotted the foothills area northward to what is now the Blackfeet Reservation.

Although the unreserved public lands were opened for settlement in 1887, the pace of settlement did not pick up until the early 1900s. The breaking of the prairie proceeded rapidly from 1908-17, a period which saw satisfactory crop yields and rapidly rising land values. But in 1917, a severe drought gripped the northwestern states, including Montana. Old-timers in the area still remember the fall of that year, when clouds of dust obscured the foothills during high winds.

Livestock men as well as farmers were hard pressed by the drought; many of them suffered heavy losses during the severe winter of 1919. In the span of a few years, the agricultural acreage had been greatly reduced and the marginal crop lands along the Front had been largely abandoned. In the spring of 1920, a steady stream of dejected homesteaders filed south through Augusta, taking their few remaining possessions with them. Crop and livestock losses during these years resulted in large tracts of land reverting to mortgage-holding companies and local governments. During the 1930s, a few cattlemen and sheepmen picked up large acreages for taxes at local sheriffs' auctions; livestock grazing once again became the dominant use of the area, a trend which has continued to this day.

THE ROCKY MOUNTAIN FRONT

WILDLIFE

Careful observations and notes made by Lewis and Clark in 1805-06 provided much of the early information about wildlife in Montana. On July 18, 1805, Clark observed: "Those streams which run off into the river [the Missouri] are dammed up by beaver from near their mouths up as high as I could see them." During the expedition's return from the Pacific in the summer of 1806, Lewis, on reaching the east slopes of the Continental Divide, reported they were back in the country of abundant game. On July 11, near the headwaters of the Sun River, hunters for the party killed five deer, three elk and a large brown bear. Lewis noted the abundance of elk, deer, antelope, bear, wolves, coyotes and buffalo, and several times remarked on the power and ferocity of the "great white bears." He also described the abundance of buffalo on one occasion as "not less than ten thousand . . . within a circle of two miles. . . ."

Although the trappers who followed Lewis and Clark left little written

Gas and oil exploration (left photo: Gary Olson) is booming along the Rocky Mountain Front. Almost all the land in state and private ownership has been leased for exploration, and applications are pending on over 95% of the nonwilderness national forest lands. Recreationists (far left photo: Peter Kagan) who enjoy the wildlife and scenic beauty of the Front fear that uncontrolled development will ruin the area. Wildlife species with small home ranges, such as mountain goats (below left photo: Gary Olson), can be placed under severe stress if they are displaced to marginal habitat for any length of time.

record of their activities and observations, it is generally accepted that wildlife was plentiful at least until the late 1840s. Just a few short decades later, however, the picture was to change dramatically. The hunting of buffalo for hides reached a peak in about 1876; by 1884, the once-vast herds had been reduced to scattered piles of bleached bones.

Although hunting in general remained good along the Front in the 1880s, wildlife populations continued to decline as settlement progressed. Comments in local newspapers in 1889 revealed that some Montanans recognized, even then, the need for closer monitoring of resource uses; some people even suggested restricting immigration into the state. In 1895, the first Fish and Game Board was authorized by the state legislature, and in 1901 the first game warden was hired.

As competition between cattle and wildlife in the Sun River intensified in the early 1900s, a conflict arose that was not resolved for several decades. In 1910, sportsmen presented a petition to the newly created U.S. Forest Service (FS) asking that cattle be removed from the upper Sun River. In an attempt to alleviate the problem, the state legislature created the Sun River Game Preserve in 1913. But in the ensuing years, wildlife numbers were to increase well beyond the carrying capacity of the available habitat.

The Depression years of the 1930s were accompanied by severe wildlife management problems along the Rocky Mountain Front. Winter losses of bighorn sheep and elk indicated a need for larger harvests of the rapidly expanding herds, which were literally eating themselves out of house and home. But wildlife experts' advice was generally ignored, and overgrazed winter range continued to cause serious vegetation damage and erosion.

In 1940—the year the first biologist began working for the Department of Fish and Game (now the Department of Fish, Wildlife and Parks)—the Sun River area was still acknowledged as a major management problem. Due to the efforts of a few farsighted conservationists, the Sun River Game Range (now Sun River Wildlife Management Area) was acquired in 1947, thus providing adequate winter range for several big game species.

The acquisition of the Ear Mountain Wildlife Management Area in 1975 added 3,200 acres of winter range to an existing 20,000 acres on the Sun River Wildlife Management Area. In 1979, the Department of Fish, Wildlife and Parks purchased 6,700 additional acres along the Rocky Mountain Front northwest of Choteau. The new tract, called the Blackleaf Wildlife Management Area, will provide winter habitat for deer and elk as well as important forage and cover for a multitude of other wildlife species.

A few important concepts can be gleaned from this brief history. One is that the public has been concerned

How do we weigh the nation's current need for energy against the value of hunting (right photo: Bill McRae) for a trophy elk or photographing a bighorn ram (left photo: Mike Logan) in its natural surroundings?

for a long time about the need to manage and maintain the wildlife populations of the Front region. Another is that the Rocky Mountain Front is a unique remnant of what Lewis and Clark and others experienced 170 years ago. It is one of the few remaining areas in the country where one can encounter elk, moose, two species of deer, bighorn sheep, mountain goats, antelope, grizzly and black bears, cougars, wolves, coyotes and many other species of birds, fish and mammals all within a relatively small geographical area. It is also one of the few areas in the United States that has huntable populations of mountain goats, grizzly bears and bighorn sheep.

THE ROCKY MOUNTAIN FRONT

GEOLOGY

The unwritten history lying concealed along the Rocky Mountain Front has been partially uncovered in the last few years by a team of paleontologists from Princeton University and a science teacher from Rudyard, Mont. They have identified, in a badlands area west of Choteau, what appears to be a dinosaur nesting ground. The fossilized eggs and remains of baby dinosaurs of two distinct types have been unearthed, leading to new theories about the puzzling disappearance of the dinosaurs from North America some 65 million years ago (see "Strange Beasts in Our Backyard" on page 2). But dinosaur remains aren't the only things being searched for along the Front these days. Certain portions, especially those lying east of the Continental Divide between Glacier National Park and Rogers Pass, have a high potential for discovery of natural gas and, to a lesser extent, oil.

This area is part of what geologists refer to as the "Northern Disturbed (or Overthrust) Belt"—a northwesterly trending zone of closely spaced thrust faults, folds and some longitudinal and transverse faults. The zone extends eastward about five to eight miles from the mountain front; the western boundary is not clearly defined, but most experts believe the Flathead Valley is as far west as the disturbance occurs. Geologists further theorize that the extremely high pressures and temperatures associated with thrust faulting may have formed natural gas through the thermal breakdown of liquid hydrocarbons.

Leasing and exploration of private and public lands by oil companies began in earnest in the early 1950s. Where roads could not be pushed into promising areas, drill rigs were towed up steep hillsides by crawler tractors. Fragile alpine ecosystems and sensitive watersheds were damaged, and eroded dozer trails and piles of dirt and rock remain today—reminders of past mistakes in planning and management.

Several wells were drilled in the 1950s, mainly in the foothill area from East Glacier to the Teton River. Natural gas was discovered in two wells in 1958, but these were abandoned because the price of gas at that time was too low to justify production. One of them, in Blackleaf Canyon, was estimated to have a potential yield of over 6 million cubic feet per day.

Exploration in the Overthrust Belt started again in 1975, when oil and gas deposits were discovered in the Utah-Wyoming-Idaho thrust belt. Today, almost the entire Front area in private and state ownership has been leased, and gas and oil exploration applications are pending on over 95% of the nonwilderness national forest lands, an area of more than 151,000 acres. Applications are also on file for more than 60% of the land in the Bob Marshall, Great Bear and Scapegoat Wilderness areas. Similar leases are pending on the land managed by the Bureau of Land Management (BLM).

According to the U.S. Geological Survey (USGS), gas deposits cannot be accurately determined without seismic surveys and possibly test holes. The FS has not yet issued leases with permission to drill; the BLM has issued

leases, but as yet no drilling has occurred. Both agencies have been receiving applications for seismic testing, and have allowed such activity in suitable locations since 1978.

Although small amounts of copper, silver, coal, sand, gravel, dimension stone and high-calcium limestone occur along the Front, gas and oil exploration comprise the bulk of the current mineral activity. Exploration thus far has had much less environmental impact than earlier activities. Helicopters have been used where roads do not exist; surface blasting techniques and specialized vehicles have eliminated much of the surface disturbance that occurred in the 1950s.

The national energy predicament has placed oil and gas exploration in a new light. Because pressures are mounting to produce as much domestic oil and gas as possible, interest in the disturbed belt has intensified. The FS has until Aug. 1, 1980 to respond to pending lease applications on nonwilderness lands, and will address wilderness mineral leasing in the Lewis and Clark National Forest Plan by late 1981.

The BLM is responsible for issuing oil and gas leases on federal lands, as well as on private lands with federal mineral rights. The FS handles seismic permits and makes recommendations concerning leasing on national forest land, but final approval rests with the BLM. When a lease is issued, the holder has the right to explore for, drill for and produce all oil and gas for 10 years, or as long as oil and gas are produced in paying quantities. BLM stipulations now require that leases be issued in three stages to allow adequate time for evaluation of environmental impacts. The first stage is a seismic testing or prospecting permit. This allows geophysical work to be done according to certain stipulations and under supervision of the agency involved. Sometimes seismic permits are issued without leasing; in such cases the permits are short-term, since the company is interested primarily in mapping the limits of a particular oil or gas deposit. The second stage in the leasing process involves granting a drilling permit. The final stage authorizes installation of pipelines, pumping stations and other equipment needed in the actual production of gas and oil. When drilling is allowed, the USGS is required to prepare an environmental analysis of each project and to recommend safeguards that will prevent damage. Both the U.S. Fish and Wildlife Service and the DFWP have input into the environmental analysis.

Recently, federal agencies have received a flood of oil and gas lease and seismic permit applications. One of the companies to apply for a seismic permit, Consolidated Georex Geophysics (CGG), plans to conduct a seismic survey for oil and gas within the Lewis and Clark and Flathead National forests. Portions of the Bob Marshall, Scapegoat and Great Bear Wilderness areas are involved, as are certain other selected spots along the Front. The application requests permission to run approximately 207 miles of seismic line. Testing, which would last about 100 days, would take place in 1980. Numerous smaller operations are also under way along the Front, with the promise of many more to follow. The FS recently

denied CGG's request in the Bob Marshall, saying the company could not explode seismic charges there since it holds no leases on land in the area. At this writing, FS officials were unsure if the decision would be appealed. Regional Forester Tom Coston noted that exploration firms have the right to test for oil and natural gas outside wilderness areas and the denial included permission for CGG to conduct limited exploration in several areas bordering the Bob Marshall.

FUTURE

How will energy exploration affect the wildlife and aesthetic resources of the Rocky Mountain Front—and the hunters, fishermen, campers, photographers and others who enjoy them? Can we live with oil and gas activity in an area where wildlife and wilderness values are so high?

Wildlife and related recreational activities have been a source of enjoyment and income to residents of the Front, as well as to outsiders, for more than a hundred years. Most people who live there believe the wildlife and scenery are irreplaceable, and that uncontrolled development will ruin the area. The nagging memory of the damage inflicted on the land in the 1950s remains.

How do we weigh the nation's current need for oil and gas against the long-term wildlife and scenic values of the Rocky Mountain Front? We can place a dollar value on an animal such as an elk (more than $1,400 was paid for a bull elk last fall at a DFWP meat auction), but what about the aesthetic value of hunting or photographing an elk or bighorn ram in its natural surroundings? What about the *quality* of the area in terms of species diversity and habitat? What about endangered species? What about the peace of mind derived from simply knowing that the Front and its wild creatures are still there, just as they have been for centuries?

The Canadians, in addressing the oil and gas question along the east slope of the Rockies in Alberta, have decided to allow seismic testing and drilling only in areas where wildlife values are not paramount. For example, winter ranges are considered critical to the survival and continued production of most big game species. Therefore, the government of Alberta either does not issue leases for these areas, or else limits access to times of the year when impacts on animals will be minimal. Calving areas and migration routes are protected. The Canadians seem to have developed a logical and orderly approach to solving a very complex problem.

Recent studies along the Rocky Mountain Front by researchers from our department have shown that deer and elk move long distances from their winter ranges in the foothills to wooded valleys west of the Continental Divide during spring and summer. Such migration routes between summer and winter ranges should be protected to ensure normal movements from year to year. Some species, such as mountain goats, have relatively small home ranges and appear less able to accommodate disturbance. These species, as well as those with specific winter range requirements, can be under severe stress if displaced to marginal habitat for any length of time.

The grizzly bear sparks much controversy throughout the nation, but it would be hard to imagine the Rocky Mountain Front without this picturesque and legendary animal wandering the foothills in early spring. The grizzly has been an integral part of the Front's ecosystem for centuries, and should continue to be. Current studies indicate the big bears depend on specific plant foods, especially in the spring; since any environmental disruption results in their departure from an area, long-term disturbances do not look favorable to the grizzly. Activity during winter months when the bears are denned would minimize impacts, but unfortunately, winter oil and gas activity may conflict with big game winter range use.

Nationwide, key wildlife habitat is disappearing rapidly, and we have a basic obligation to preserve the wildlife resource for future generations. The Rocky Mountain Front has a diversity of flora and fauna that is rare, even in the Pacific Northwest. Considering the current energy situation, it seems highly likely that energy exploration will intensify. Because we have no good way of judging the impacts of energy exploration on wildlife in this area, the process should be undertaken slowly and cautiously.

This message was driven home a few months ago, as noted Montana author A. B. "Bud" Guthrie, Jr. and I were standing on the porch of his cabin west of Choteau discussing resource issues. We were watching a long bank of dark clouds roll over Ear Mountain to the west of us, driven by the strong winds common along the Front.

His love and concern for this harsh but beautiful country were evident as he spoke: "You know, Montana has always been a 'get in-get out' state—fur, gold, copper, and now coal and gas are much the same. They are all extractive industries."

Guthrie believes, as do most residents of the Front, that uncontrolled expansion will ruin the area, and that the mistakes of the past cannot be allowed to happen again. Development —including gas and oil exploration— should proceed slowly, with the necessary environmental safeguards, to ensure that the magnificent wildlife and scenery of the Front will be preserved for posterity. ■

Wildlife Shorts

Insects have been found from sea level to 20,000 feet. Most are found below 1,000-foot elevations.

* * * * *

The crayfish can replace lost appendages and eyes. This ability of regeneration is greater in younger animals.

* * * * *

The most abundant and widespread of all land animals are insects. Over 800,000 species have been identified.

* * * * *

Poisonous snakes have a pair of specialized teeth or fangs on the upper jaw. In the cobra and other similar snakes, these fangs are fixed; in rattlesnakes and other vipers, the fangs are folded back when not in use.

* * * * *

On the average, shrews and mice may number 50-100 per acre. Population density varies with available cover and food.
—Vince Yannnone, youth educator

C. M. Russell's "The Scout" (Mackay Collection; courtesy Montana Historical Society).

The Saga Of George Drouillard

by Dick Ellis

DAWN WAS approaching as a buckskin-clad trapper left the sanctuary of the log fort at the headwaters of the Missouri and turned his horse up the shore of the Jefferson River. The chill wind of early May rose with the sun, stirred the branches of cottonwood and willow and scattered the sounds of morning.

The trapper's senses were alert to the flicker of birds' wings and the snap of wind-tossed branches as he traversed the two miles to a promising backwater where he had set his traps the day before.

Suddenly, above the wind rose the challenging cries of a Blackfeet war party. With the mounted warriors bearing down upon him, the trapper hastily checked his weapons and prepared to defend his life. As the battle closed, he fought desperately, circling for advantage. He took deadly aim with rifle and pistol and, in the end, slashed out with knife and tomahawk.

But within moments, he was surrounded and overwhelmed. As he fell, the sounds of combat faded and the victorious cries of the attackers resounded through the clearing.

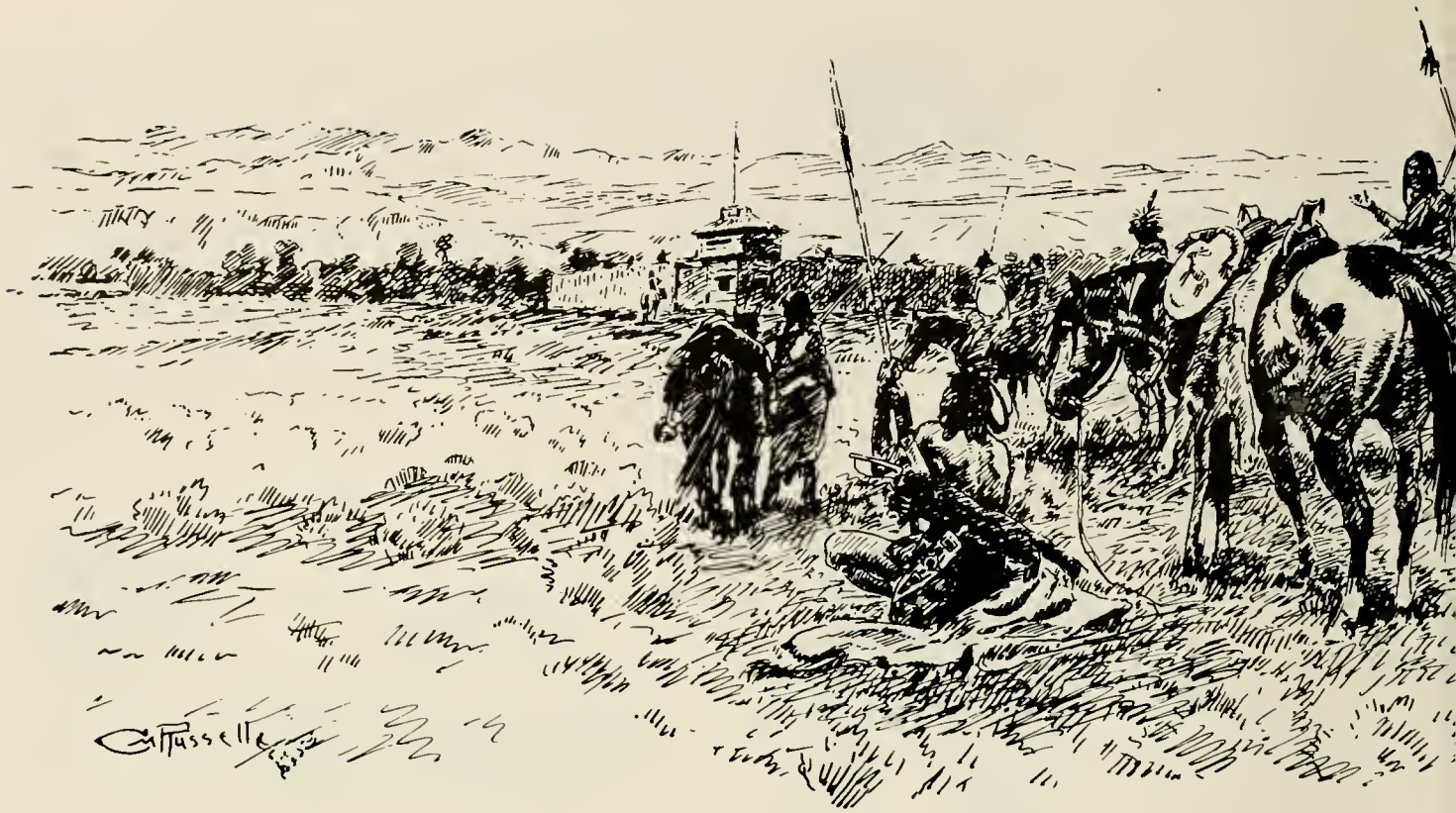
Pausing but a moment to take final revenge on the body of the fallen trapper, the war party crossed the river and departed to the north.

Again, beneath the wind, there was silence along the shores of the Jefferson.

Thus died George Drouillard: hunter, fur trader, trapper, interpreter and invaluable member of the Lewis and Clark Expedition.

Born of a French-Canadian father and Huron Indian mother, Drouillard was raised in surroundings that taught him well the skills of a woodsman and hunter and the art of sign language. It was through these skills that he became an interpreter in the U.S. Army.

During the winter of 1803, Capts. Meriwether Lewis and William Clark were gathering their small force of men with which they were to face their epochal journey of exploration to the Pacific Ocean and back. Arriving at the Ohio River military



post of Fort Massac in November 1803, Capt. Lewis lost no time in arranging the transfer of Drouillard to his command, and thus secured the services of one who was to play a vital part in the successful completion of the upcoming venture. Hired in the official capacity of interpreter, Drouillard was also to fill numerous other roles, not the least of which was that of chief hunter.

Soon after leaving St. Charles (a small river town above St. Louis), the expedition began to depend on its hunters to supply the bulk of the food for the 43 men engaged in pulling, paddling and poling the 55-foot keelboat and two smaller open pirogues against the relentless current of the Missouri. Drouillard and from two to five others were usually on shore hunting deer, bears, turkeys and a variety of waterfowl and small game common to the lower Missouri River Valley.

Routinely, the journals of the expedition note the abundance of game and the success of its most accomplished hunters. On June 11, 1804, it is noted: "George Drouillard killed two bears. We now have abundant meat so some of it was cured for later use." On June 22: "George Drouillard killed a bear weighing nearly 500 pounds." A few days later, the journals stated: "We sent Drouillard and Joseph Fields out to hunt. Drouillard killed six deer and Joseph Fields got one."

Day after day, as the party slowly made its way up the winding Missouri, its needs were met by the guns of the hunters. By August, elk were added to the larder and near the end of that month, the hunters brought in the first buffalo. The pronghorn antelope, an animal "new to science," was encountered early in September and by this time the plains were "covered with buffalo."

During the winter of 1803-04, the explorers utilized Drouillard's prowess as a hunter. He ranged widely to locate game, often 20 or 30 miles from the winter encampment near the Mandan villages, and often spent the nights alone on the prairie.

As spring approached, the expedition's keelboat was dispatched back to St. Louis and a pared down party, now numbering 31, continued westward. Game was plentiful and easily approached and the hunters had little trouble providing the required "one buffalo per day," or its equivalent.

A few days out of Fort Mandan, the explorers began to see signs of the famed "white bear" of the prairies and were anxious to test themselves against this formidable foe. Shortly after passing the mouth of the Yellowstone River, the opportunity was presented and it was soon obvious the prairie grizzly was more than a match for their black powder rifles. Time and again these powerful adversaries absorbed multiple wounds and still retained the vitality to pursue their attackers to the brink of tragedy. Capt. Lewis noted: "These bear being so hard to die rather intimidates us all." On June 27, 1805, when near the Great Falls, Drouillard and Joseph Fields killed "the largest yet seen" by climbing a leaning tree and shooting from this vantage point.

Although acknowledged to have no peers as a hunter, Drouillard was also called on to serve as a trusted scout and messenger, nearly always at the side of the expedition leaders when Indians were encountered. Although verbal communication was used when possible, Drouillard's skill at sign language proved invaluable on many critical occasions.

None was more crucial than that in early August 1805, when the captains desperately sought contact with the Shoshone Indians to acquire horses to carry them over the mountains to the headwaters of the Columbia. After weeks of anxious searching, a small advance party led by Capt. Lewis

C.M. Russell's "The Fort at Three Forks" (courtesy Amon Carter Museum; Fort Worth, Tex.)

finally met with a band of Shoshone led by Chief Cameahwait. Tenuous contact was maintained for four anxious days by dispensing trinkets, gifts and game meat and by Capt. Lewis' persuasions, relayed by the skilled hands of Drouillard. The arrival of the main party and Sacajawea reinforced the tentative trust which had been established and the expedition was soon continuing westward, mounted on Shoshone horses.

Following a trying period of near starvation which even the hunting skills of Drouillard could not alleviate, the expedition reached the headwaters of the Columbia. Leaving their horses in the care of the Nez Perce, the explorers again took to canoes and descended to the shores of the Pacific.

Elk, deer and salmon provided the main fare throughout the wet winter on the Coast. Hunting in the dense forests was a demanding enterprise and Drouillard's skills were again recognized by Capt. Lewis who wrote: "I scarcely know how we should subsist were it not for the exertions of this excellent hunter."

With the arrival of spring, the explorers were anxious to start on the long road home and soon were struggling against currents and cascades they had descended the previous fall. Traveling both by water and by land, the captains again found themselves in the serious business of trading for horses and negotiating for a guide to lead them over the snow-covered Bitterroot Mountains. The Indians of the western slope had been particularly difficult to deal with and Drouillard's skills as a communicator again proved invaluable.

By June 29, 1806, the formidable Bitterroots had been crossed and the party had reached "Lolo Springs" which the Indians had made into a bath by "stopping the warm stream with stones and gravel." The journals report that "the men took a warm and refreshing bath."

Descending the next day to their old encampment where Lolo Creek empties into Clark's (Bitterroot) River, the party divided. Capt. Clark retraced the route of the preceding year to the headwaters, then up the Gallatin and over to the Yellowstone River which they would descend to its junction with the Missouri. Capt. Lewis and a contingent which included Drouillard headed northeast toward the falls of the Missouri, with the added purpose of determining the northerly latitude of the Marias River.

During this excursion on the Marias, the explorers first encountered the formidable Blackfeet. Although Drouillard relayed a message of good will, and gifts were given to the "chiefs," the small party of explorers remained apprehensive as night approached. Tentative relations suddenly exploded when Blackfeet warriors attempted to steal the party's guns and horses. In the resulting melee, two Indians were killed.

Expecting retribution, Capt. Lewis and his men retreated to the relative safety of the Missouri River. Riding the sturdy Indian ponies, they covered more than 80 miles before resting two hours. They then remounted and rode on to the Missouri. Abandoning their exhausted horses, the party took to canoes which had been brought around the Great Falls by Sgt. John Ordway, and, covering as much as 100 miles in a day, rapidly descended the Missouri.

On Aug. 12, 1806, they met Clark at a planned-for spot below the mouth of the Yellowstone. By late September, the expedition had reached its old camp near St. Charles —the departure point over two years before.

At the end of the adventure, the captains settled accounts and discharged the men who had served so well. Some were singled out for special recognition and, not surprisingly, George Drouillard was one of those. Lewis wrote of him: "A man of much merit, he has been peculiarly useful from his knowledge of the common language of gesticulation, and his uncommon skill as a hunter and woodsman; those several duties he performed in good faith, and with an ardor which deserves the highest commendation. It was his fate also to have encountered, on various occasions, with either Captain Clark or myself, all the most dangerous and trying scenes of the voyage, in which he uniformly acquitted himself with honor."

When the Lewis and Clark Expedition returned with glowing accounts of abundant beaver in the western mountains, the interest of St. Louis fur traders was kindled. By the following spring, Manuel Lisa, the most enterprising of the traders, had organized a party to ascend to the upper reaches of the Missouri and establish trading posts among the Indians.

Drouillard was among those who joined in this endeavor. Following a long trek up the Missouri, he was once again matching his skills against the challenges of the western wilderness. By October 1807, the party had reached the mountains and a trading post known as Fort Lisa (also Fort Manuel or Manuel's Fort) was built where the Bighorn River joins the Yellowstone.

The success of Lisa's venture depended largely on the skills of his chief emissaries, Drouillard and John Colter, who set out into the unmapped wilderness, contacted as many winter camps as they could find and persuaded the Indians to bring in their furs and exchange them for goods.

During this winter, Colter traversed the area of steaming geysers and bubbling mud pots known as Colter's Hell (now Yellowstone National Park). Until verified many years later

Karl Bodmer's "Hunting of the Grizzly Bear" (Tryba Collection; courtesy Montana Historical Society).

by others, his observations established him as one of the era's most imaginative liars.

By the following August, Lisa's venture had proved successful and his boats departed on the long voyage to St. Louis. There, furs were sold, personal business transacted and new trade goods purchased. While in St. Louis, Drouillard met with William Clark and added his new knowledge of the country south of the Yellowstone River to maps being drafted by his former captain.

The following spring, Lisa joined forces with other St. Louis merchants to form the Missouri Fur Company and was again ready to push westward. Drouillard also chose to return to the western frontier. In spring of 1809, he started on what was to be his final adventure.

The fall and winter of 1809 were spent trading with Indians near Fort Lisa. By March of the next year, the traders were ready to attempt a long-planned expansion of their influence to the three forks of the Missouri.

With Colter as the guide, a party of 32 men led by Pierre Menard headed northwest up the Yellowstone and 10 days later started toward a "gap in the mountains" (Bozeman Pass). Travel at this early season was not easy and the party was nearly buried as it fought heavy snow in the pass. Gen. Thomas James, chief chronicler of the venture, wrote: "The morning showed us the heads and backs of our horses just visible above the snow which had crushed down all our tents."

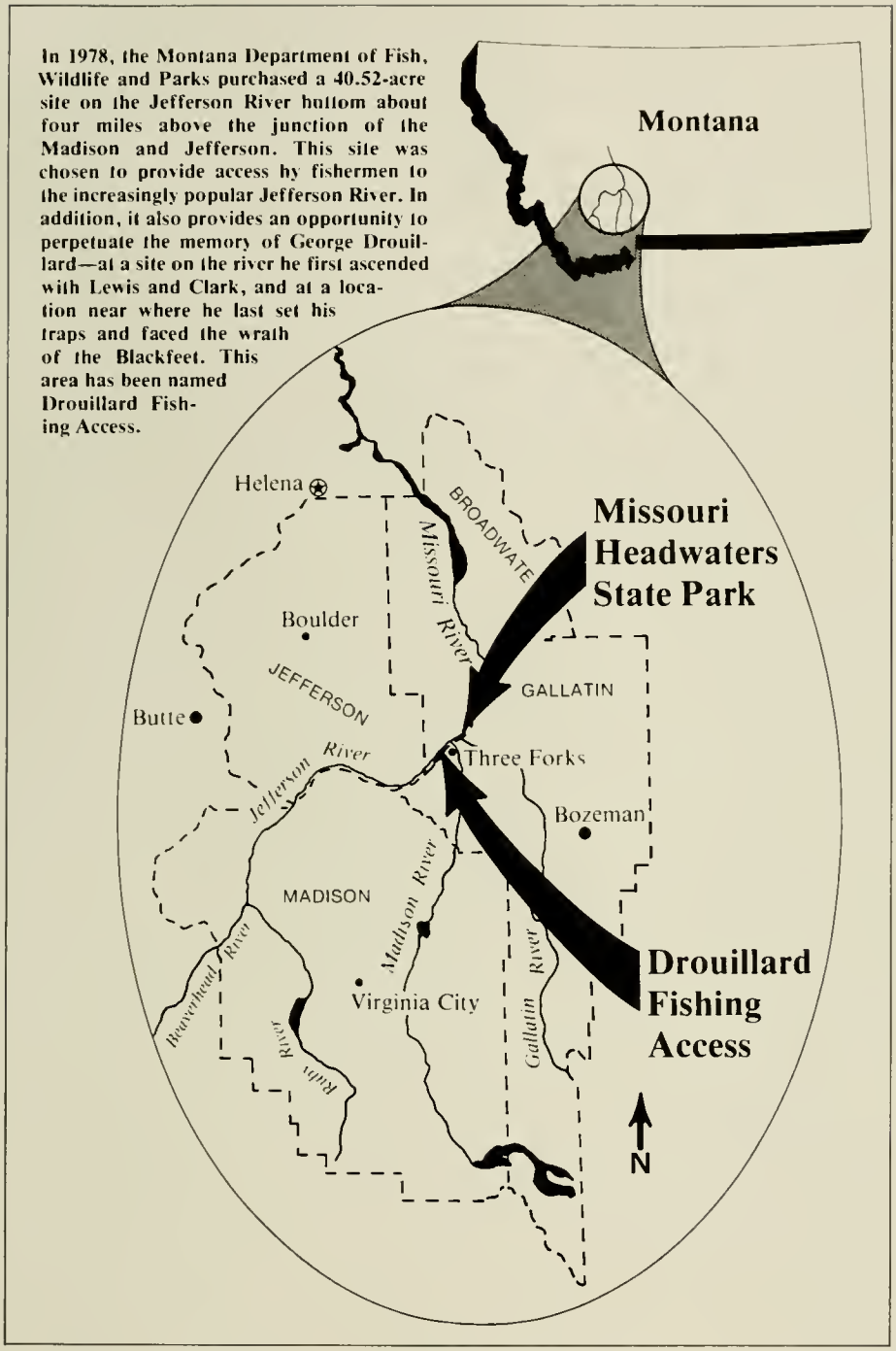
Struggling west, the party emerged from the deep snows of the pass to be greeted by new adversities. As the clouds departed, bright sunlight reflecting from the snow caused the entire party to suffer severe snow blindness. For several days, the men endured great pain and hunger and lived in constant fear of attack by hostile Indians.

Slowly recovering, they moved on down the Gallatin River and approached the Missouri forks. About a day's journey from their goal, the traders came on an unnerving scene: Scattered about was a "vast number" of human skulls and bones, the result of a battle the preceding year between Flathead and Crow Indians on the one side, and Blackfeet on the other.

Undoubtedly, Colter related the thrilling tale of the encounter since he had been an unwilling participant. He and a band of Flatheads en route to Fort Lisa had been attacked by a large number of Blackfeet who threatened to overwhelm them. Then the Crow came to their rescue. In defense of his own life, Colter fought against the Blackfeet.

When he reached the three forks, Menard immediately began constructing a fort to serve not only for defense, but also as a center for the hoped-for trade with the Blackfeet. Many years later, Lt. James Bradley described the fort as "a double stockade of logs set three feet deep, enclosing an area of about 300 feet square, situated upon the tongue of land (at that point half a mile wide) between the Jefferson and the Madison Rivers about two miles above their confluence."

While some of the men built the stockade, others were sent out to trap beaver on the Missouri and its tributaries. Beaver were plentiful and the men trapping the Jefferson had moved up the river about 40 miles when the Blackfeet first struck. (During this period, trappers often confused the Blackfeet with the Gros Ventre.) On the morning of April 12, the Blackfeet descended on them and five trappers were killed or captured. The rest, including Drouillard and Colter, hid in the willows and made their way back to the fort. They took refuge for several days, expecting attack.


In 1978, the Montana Department of Fish, Wildlife and Parks purchased a 40.52-acre site on the Jefferson River bottom about four miles above the junction of the Madison and Jefferson. This site was chosen to provide access by fishermen to the increasingly popular Jefferson River. In addition, it also provides an opportunity to perpetuate the memory of George Drouillard—at a site on the river he first ascended with Lewis and Clark, and at a location near where he last set his traps and faced the wrath of the Blackfeet. This area has been named Drouillard Fishing Access.
Montana
Helena
Missouri Headwaters State Park
BROADWATER
Missouri River
Boulder
JEFFERSON
GALLATIN
Butte
Jefferson River
Three Forks
Bozeman
MADISON
Madison River
Drouillard Fishing Access
Beaverhead River
Virginia City
Gallatin River
Ruby River
N

Although greatly unnerved by the Blackfeet hostility, the survivors soon continued trapping and hunting near the fort.

Indians were seen frequently enough to keep the trappers on guard. To add to their consternation, a new foe appeared. The giant grizzly bear began to emerge from hibernation in large numbers and proved to be nearly as formidable as the lurking Blackfeet. In the words of James, grizzly bear "in this region are of enormous size, sometimes weighing 800 pounds each, and when wounded are the most terribly ferocious and dangerous to the hunter of all other animals. . . . These were the terrors of our men as much as were the Indians and they usually spoke of them both as equally terrible and equally to be avoided."

In spite of the dangers, as May approached the men began to trap farther from the fort, first in large numbers and then in smaller groups as they became bolder.

Drouillard, perhaps more confident than the others, ventured forth alone to set his traps in choice locations on the Jefferson. The first day, he set his traps about a mile from the fort and retrieved six beavers. After being warned of the danger of working alone, Drouillard replied: "I am too much of an Indian to be caught by Indians." On the second day, his success was repeated.

On the third day, Drouillard selected a site about two miles above the post to place his traps. Starting out alone to retrieve them, he was followed a short while later by a larger party. The wind was strong and no sound betrayed the scene the later group was soon to witness and which James reported: "Farther on, about one hundred and fifty yards, Druyer [Drouillard] and his horse lay dead, the former mangled in a horrible manner. . . . We saw from the marks on the ground that he must have fought in a circle on horseback and probably killed some of his enemies, being a brave man and well armed with a rifle, pistol, knife, and tomahawk."

Shortly after, Menard gave up hope of establishing trade with the fierce Blackfeet or of conducting a successful trapping venture. He and his party soon abandoned the Three Forks post, leaving behind the remains of George Drouillard and the others who had given their lives in the opening of Montana and the West.

For additional information, consult:

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